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THE COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.

Baker Electrics

Baker Electric Trucks

It is better business to *invest* a little more money in a Baker Electric than to *spend* the difference annually in repairs on a lower priced truck. Every extra dollar put into Baker construction is worth ten to the owner in the saving of repairs.

THE BAKER MOTOR VEHICLE CO., Cleveland

PUBLISHED THE 15TH OF EACH MONTH

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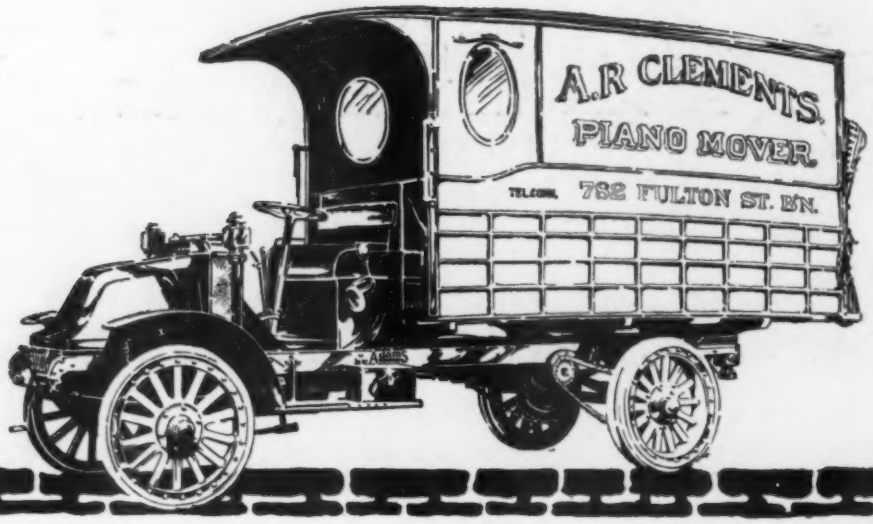

Adams Trucks

"Deliver the Goods"

Reliability is built into an Adams Truck by exceeding, in every part, the recognized margin of safety in its construction.

Adams Trucks have that "little bit more" in power plant and materials that gives confidence and insures continuity of operation under the most severe conditions.

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More than that, Adams construction represents pioneer work along those lines which time and practical use have proved most worthy to endure.

WRITE US ABOUT ADAMS REPRESENTATION IF THERE IS NO ADAMS DEALER IN YOUR CITY

THE ADAMS BROS. COMPANY

438 West Main Cross **FINDLAY, OHIO**

Built in 1, 1½ and 2 ton models. First American Truck Manufacturers to use the French type of hood, with radiator at rear of motor.

THE PUBLISHERS' PERSONAL PAGE

"One of These Days is None of These Days"

Mr. Truck Buyer,

now is your opportunity. At this time, when the industry is undergoing its reorganization period; during this time, when competition between the makers is at its keenest; at this time, when the rivalry is at its height, we say, —now is your opportunity. Never at any time since the birth of the commercial car industry has it been possible to buy trucks at such a low figure or on such easy payments.

Do Not Procrastinate

Some one has said, "In the short life of man no lost time can be afforded." This is even more true to-day in business than it was in the time of our fathers. Business to-day is carried on at high pressure; intensive business is the order of the day. This means that you must keep up with the procession.

Now is the Time to Buy Trucks

The concern that waits until everything is prosperous to make its improvements or adopt methods which will put it head and shoulders above its competitors, makes a fatal mistake. The time to make such a move is when the other fellow is hanging back. The progress which you make is merely comparative, and in profits is shown by the distance between you and your nearest competitors. When others halt or stumble and are losing ground, is the time for you to profit by greater speed and efficiency in your business.

More Time!

is the usual exclamation. You should bethink yourself more about better methods, or less time wasted.

Undoubtedly, one of the greatest accelerators of modern business has been the regeneration of transportation systems, made possible by the use of commercial cars. If you have not yet investigated what can be done, and what is being done in the various lines of trade, with this latest and most modern piece of machinery, **You are one that is losing time.**

Most Important,

however, is the purchase of the right kind of truck or trucks, the right-sized units, and the placing of same in the hands of **competent drivers.** Where can you get such information, you ask. That is our business; that is why we are here. We are publishing in each issue of the ***Commercial Car Journal*** just the facts which you should know in order to save yourselves money in both the purchase and use of trucks. The success and failure of users, with their causes, are recorded by our special correspondents, from personal interviews. The subscription price is $1 per year.

Send your dollar by return mail.

Chilton Co., Market & 49th Sts. Philadelphia, Pa.

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I cannot feed on grass or oats,
My feed is through a can that floats;
I cause the horses such a fright
They just sit down for fear I'll bite;
But any work that they can do
You ought to see me put it through.

A Growing List of Autocar Investors

WITHIN 30 DAYS after announcing **The New Autocar Delivery Vehicle type 21-F,** the following concerns invested, having seen and appreciated the excellence of this broadly used vehicle as the best means of securing the economical and immediate expansion of their business. The Autocar is an acknowledged business getter, as proved by over 1200 users, owning from 1 to 188 Autocars each. You cannot afford to purchase any other make of delivery vehicle until you have examined the new Autocar now on exhibition and ready for delivery.

Express
Dept. Stores
Ice Cream
Butchers
Pianos
Coal
Cocoa
Grocers
Jewelry
Hardware
Undertakers
Caterers
Dry Goods
Moving Pictures
Produce
Oils and Gasoline
Bakers
Bottlers
Fruits
Railroads
Furniture
Laundries
Brewers
Florists
Parcel Delivery
Confectioners
Hotels
Passenger Service

Cobb, Bates & Yerxa Co., Boston
Crew Levick Co., Philadelphia
Chas. Strickler & Son, Philadelphia
F. A. North Co., Philadelphia
Atlantic Refining Co., Philadelphia
Armstrong Transfer Co., Boston, Mass.
R. H. White Co., Boston, Mass.
Deerfoot Farms, Boston, Mass.
Martin's West Roxbury and Roslindale Express, Roslindale, Mass
Geo. S. Raynes Co., Philadelphia
A. M. Riley & Co., Orange, N. J.
L. Schulman & Co., Booklyn
Vogt & Ciesliwacz, Chicago
Gravel Springs Co., Chicago
Stichter Hardware Co., Reading, Pa.
Potter's Express Co., Camden, N. J.
Peter Vitullo & Co., Philadelphia
Ryan Bros., Rosemont, Pa.
G. F. Heublein & Bro., Hartford, Conn.
Household Furniture Co., Providence, R. I.
Reeder's Express, Reading, Pa.
J. M. Dean Co., Providence, R. I.
Geo. E. Fogg, Braintree, Mass.
Gibbs-Brown Oil & Gasolene Co., St. Louis, Mo.
Seeman Bros., New York City
John Wanamaker, Philadelphia and New York
Pennsylvania Railroad Co., Altoona, Pa.
Freihofer Vienna Baking Co., Philadelphia
C. J. Heppe & Son, Philadelphia
L. Bamberger & Co. Newark, N. J.
Empire Mining Co., Grass Valley, Cal.
Hotel Sacramento, Sacramento, Cal.
E. J. Dowding, Providence, R. I.
H. S. Levy, New York
Robert Scott & Son, Sharon Hill, Pa.
Herman Gabbe, Brooklyn, N. Y.
George G. Danford, Buffalo, N. Y.
Evertson & Borling, Brooklyn, N. Y.
Gately & Hurley, Camden, N. J.
Brewster Cocoa Co., Jersey City, N. J.
Bogold Bros., Buffalo, N. Y.
Hand Brewing Co., Pawtucket, R. I.
A. Blechner's Sons, Inc., New York City
Robert Steel, Philadelphia
P. Meehan Co., Philadelphia
Sage, Allen & Co., Hartford, Conn.
McKenny & Waterbury Co., Boston, Mass.
J. M. Hughart
Smedley & Mehl, Ardmore
J. M. Horton Ice Cream Co., New York City
Thos. M. Shaw, Audubon, N. J.
Strawbridge & Clothier, Philadelphia
J. H. Michener & Co., Philadelphia
Swift & Co., Philadelphia
Lubin Mfg. Company, Philadelphia
Carson, Pirie, Scott & Co., Chicago
Lonsdale Baking Co., Boston
Club Laundry, New York
P. Hughes' Sons, Philadelphia
Wm. Rode, Philadelphia
Crown Cork & Seal Co., Baltimore
Metropolitan Park Commission, Boston
Coca Cola Bottling Co., Paraiso, Canal Zone
Jno. C. Kimmerle, Philadelphia
Tony Kayser, Philadelphia
Michael Leonard, New York
A. S. & I. Bloch, New York
Mt. Shasta Water Co., San Francisco
United States Tire Co., San Francisco
Ward's Express, Hackensack, N. J.
Frank E. Wattles, Buffalo, N. Y.
Horace B. Wimley, Philadelphia
Quadrel Bros., Montclair, N. J.
Excelsior Express & Parcel Delivery Company, New York
Geo. Kern, Inc., New York
Louis F. Mazzetti, New York
Simpson's Express, Hackensack, N. J.
James J. Quigley, Philadelphia
N. D. Bush, Caldwell, N. J.
Union Transfer Co., San Francisco
Manufacturers' Outlet Co., Providence, R. I.

AN EXCEPTIONAL DELIVERY VEHICLE AT AN EXCEPTIONAL PRICE

WRITE FOR FOLDER OF NEW AUTOCAR DELIVERY VEHICLE, SHEET "C"

The Autocar Company

ESTABLISHED 1897

Ardmore, Pa.

SERVICE DEPARTMENTS NEVER CLOSED

Philadelphia 23d & Market Streets — **New York** 428-437 W. 19th Street — **Newark** 418 Washington Street — **Boston** 642 Beacon Street — **Providence** 302 Pearl Street

Other Branches and Service Stations — Chicago, St. Louis, San Francisco, Los Angeles, Pittsburgh, Toronto, Buffalo, Scranton, Harrisburg, Baltimore, Washington, Atlanta, Reading Wilmington, Springfield, Trenton

The Commercial Car Journal

VOLUME VI PHILADELPHIA, NOVEMBER 15, 1913 NUMBER 3

PACKARD CAPITAL INCREASED

Packard Motor Car Company, Detroit, at the annual meeting of stockholders, raised the capital stock of the company from $10,000 to $16,000,000; $3,000,000 of which is to be 7 per cent. cumulative preferred stock and $3,000,000 common, which makes a total of $8,000,000 of each. Only $1,000,000 of the new common stock will be salable, however, as the balance is to be distributed among the present owners of Packard common stock as a stock dividend. The remaining $4,000,000 of stock will not be placed upon the market, but will be retained for reserve capital. The surplus for the fiscal year past is $1,807,472. A dividend of 40 per cent. has been declared, amounting to $350,000 as it did last year. The company's total assets are $17,339,848.

S. A. E. WINTER PROGRAM

A rough draft of the program of the January session of the Society of Automobile Engineers, to be held in New York City, has been issued by the Council. The session will continue from Sunday, January 4, until Thursday, January 8th. In drafting the program an effort has been made to make it possible for the engineers to spend considerable time at the automobile show, which will be held that week at the Grand Central Palace. On this account the professional sessions will be held in the auditorium in the show building, and the sessions will be shorter than usual. The program is as follows:

Sunday, January 4—Social gathering of the members in the afternoon at the Manhattan Automobile Club.

Monday, January 5, 10 A. M.—Meeting of the Standards Committee at the S. A. E. office.

Tuesday, January 6—Professional sessions in morning, afternoon and evening; morning session includes business meeting, elections of officers, etc.

Thursday, January 8—Professional sessions in morning and afternoon at Grand Central Palace and banquet in evening.

RUBBER PRODUCERS TO COMBINE

The continual decline in the price of crude rubber has been the direct cause for the agitation of the formation of an association of crude rubber growers, with the object of maintaining prices and restricting outputs. It is the idea of those who are prominent in the formation of this association to establish a clearing house for all the crude rubber produced, and to fix a price at which it will be sold instead of the present method of each grower getting the best price he can from the dealers.

THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio, has announced a regular cash dividend of 12 per cent. on its common stock. The company is to be greatly congratulated on this excellent showing, notwithstanding the disastrous flood which took place during the year, and also the strike which lasted for some considerable time. The output for the fiscal year ending October 1, 1913, was increased from $26,000,000 to $33,000,000.

TWO NATIONAL MOTOR TRUCK SHOWS

Notwithstanding the announcement of the Automobile Chamber of Commerce, that the National Motor Truck Shows would not be held this year, there will be an opportunity for all prospective buyers of trucks to view all the different makes on the market gathered together in one place.

This will be in the two "Buyer's Information" numbers of the COMMERCIAL CAR JOURNAL, which will be issued in January and February. The January number will be the "Eastern Buyer's Information" number containing details and illustrations of all the commercial motor cars made in the East, and the February number will be the "Western Buyer's Information" number, embracing all those made in the West; the January number taking place of the New York Show, and the February number taking the place of the Chicago Show.

These two numbers will show every commercial motor car built in the United States. They will in fact, cover a broader field than the two national shows did formerly. There will be a great many more commercial cars shown in these two numbers than were ever assembled at any two shows. There will also be a tremendous number of motor truck parts and accessories shown. This will give those concerns who desire to view the entire field before making their purchases, an excellent opportunity of doing so. It will also give the dealers who want to add commercial cars to their line, an opportunity to make desirable comparisons.

This is, in fact, the most practical and economical method of producing a show. Not only because of the fact that a greater number of commercial cars, parts, etc., will be shown, but also because of the fact that a greater number of prospective purchasers will see them.

These two numbers will constitute a buying reference which will be kept by the trade throughout the entire year.

MONTREAL ENDEAVORING TO EXCLUDE MOTOR TRUCKS

A by-law, which proposes the excluding of any motor vehicle from the streets of the city, has been drawn up and put before this city council of Montreal, Quebec. This bill prohibits any vehicle for commercial purposes, not running on rails or propelled by muscular power from the streets or the public bridges.

THE INTERNATIONAL HARVESTER COMPANY, makers of the I. H. C. commercial car, of which a great many have been sold during the past few years, has been sued by the United States Government as a trust monopoly. The Government is endeavoring to force a dissolution of the Company.

ACCORDING TO A REPORT recently made public by Secretary of State May, of New York, on the first of November 13,000 commercial vehicles were registered in that State. This number represents an increase of 46 per cent. over last year. The total number of motor vehicles registered was 130,000.

INTERNATIONAL MOTOR COMPANY'S INTERNAL DISPUTES MAY LEAD TO SERIOUS DIFFICULTIES

The International Motor Company, New York City, which was formed for the purpose of consolidating the Mack Brothers Motor Company and Saurer Motor Company, is now in the midst of a serious contention among its stockholders. The majority stockholders who are in the control of a board of Trustees recently decided that the company needed additional capital, and determined to negotiate a loan for $1,200,000.

The minority stockholders took exception to this, and as no opportunity was given them to fight it out in the company meeting several weeks ago, they applied to the courts for an injunction to prevent the majority from negotiating the loan, and secured a temporary injunction.

The minority stockholders are not only contesting the negotiation of the $1,200,000 loan, but they want the consolidation contract under which the International Company was formed set aside, and the company dissolved, because of alleged discrepancies between the appraised value of the Saurer Motor Company, between the figures of the North American Audit Company, and accountants Ernst & Ernst's appraisal, both made at the time the Saurer Company was taken into the consolidation, August 31, 1911.

The North American Audit Company's appraisement of the worth of the Saurer Company exclusive of patents and good will, was stated to be $4523, and Ernst & Ernst's appraisal was $538,982, whereas the net worth guaranteed by the Saurer Company is $600,000.

The minority stockholders have also made a motion to have a receiver appointed for the company. It is expected that a decision on this last motion will be handed down about November 12 or 13th, and the voting trustees of the company have postponed action on the proposed loan until November 14th.

STANDARD ROLLER BEARING IN RECEIVERS' HANDS

The Standard Roller Bearing Company, of Philadelphia, Pa., was placed in the hands of the receivers, Robert S. Woodward, Jr., and S. Laurence Bodine. According to S. Howard-Smith, secretary and treasurer of the company, the trouble was precipitated by inability to get loans continued.

"Just the simple fact remains," he said, "that it is the present tendency of the New York banks to contract rather than expand loans. Our company is one of those which has failed to get some of the loans renewed."

Explaining the receivership and the prospects of the company, counsel made the following statement:

"The bill stated that the assets of the company, if properly conserved, were largely in excess of its liabilities.

"The appointment of the receivers was made necessary by call of outstanding loans, and to avoid the complication or loss that might result to the property from suits and other proceedings this action was taken in the interest of all concerned.

"The receivers will continue operating in the manufacture of steel balls, ball bearings, roller bearings and Rudge-Whitworth wire wheels for automobiles. Assurance that the business will continue will be good news to the employes, who number more than 1000."

ANOTHER AUTOMOBILE FUEL

Neither gasoline or kerosene is used by the Fort Worth Gas Company of Fort Worth, Texas, in the operation of two Commerce motor trucks purchased last year from the Commerce Motor Car Company, of Detroit, through the Dallas, Tex., dealers, the Texas Motor Car and Truck Company. The discovery of a way to reduce the price of operation of motor trucks by the gas company is interesting. Especially is this so when it is known that the company brings about a saving of thirty per cent. in operation with a vast increase in power. The Fort Worth Company has come across something so entirely new as to be well worth investigation. The company manufacturers Pintch gas for railroad cars and residences and accumulates gallons of residue per day. This residue has been of no use at all and had been stored in great tanks for months awaiting the rise of the water in the river, when it was allowed to run out. The residue is brownish in color, and in nature is hydro-carbon. By filtration through a small still the residue becomes white and when in this condition No. 2 Polarine oil is mixed with it in the proportion of two of the oil to one of the filtered mixture. The compound resulting brought an expense of but 11 cents per gallon and was tried with identically the same carburetor adjustment as gasoline. The result was perfect and a great saving was effected, while the power of the trucks was increased, according to the drivers, almost one-third. The only trouble which came from the fluid's use was starting in chilly and cold weather, but the drivers simply spin the motor a little more in starting and rarely have any serious trouble. Some carbonization results, but the carbon is soft and works away easily, giving no trouble. The company not only made enough of the material for its own use, but started to market it to other owners of motor trucks with profit. The gas companies of other cities when appealed to were found to have a residue also of this compound from Pintch gas and when told of the discovery down in Texas immediately took steps to make a trial of the mixture to learn of its worth in their district.

POPE IN HANDS OF RECEIVER

Pope Manufacturing Company, of Hartford, Conn., manufacturers of Pope commercial and pleasure cars and motorcycles, etc., has been placed in the hands of Colonel George Pope, Treasurer of the Company, as receiver, pending the appointment of a permanent receiver on December 5th. It is understood that the receivers will be appointed with the idea of continuing the business. The action was caused by the inability of the Pope Company to renew its debenture notes, which will come due in April next.

KANSAS CITY, MO., has risen to third place in the list of distributing centers for motor vehicles in this country, New York City and Chicago only surpassing it. The sale of commercial vehicles there during the past twelve months amounts to $1,500,000. The tire and accessory business for both commercial and passenger vehicles amounts to $3,000,000. The territory covered by Kansas City includes all of Kansas and Oklahoma, all of Missouri, and parts of Nebraska and Texas.

THE TRANSCONTINENTAL FREIGHT BUREAU, New York City, has reduced the transcontinental freight rates on some chasses of commercial vehicles, the reduction taking effect December 1, 1913. Heretofore trucks have been billed at the same rates as passenger cars.

Personal Items

W. E. JOHNSON has been appointed sales manager of the Duplex Power Co., Charlotte, Mich., which was recently organized, to build motor trucks.

W. C. NOMES, president of the Kentucky Wagon Manufacturing Company, Louisville, Ky., has resigned, and his successor has not yet been appointed.

C. H. WALLERICH, vice-president of the Brown Commercial Car Company, Indianapolis, who has been ill for several weeks, has recovered and is now back in the office.

HARVEY L. HOOKE, assistant general manager of the Gramm Motor Truck Company, Lima, Ohio, has been transferred to Elyria, where he will have charge of the plant of the Garford Company. He is succeeded by E. A. Williams, Jr.

H. E. PHILLIPS, head of the educational department of the Delco, in conjunction with members of J. J. Cole's engineering staff, has been conducting a school at the factory of the Cole Motor Car Company. Mechanics from Cole agencies in Iowa, Minnesota, Mississippi, Tennessee, Illinois, Michigan and all parts of Indiana came to the Hoosier metropolis to take advantage of this opportunity to become Delco experts.

W. F. REYNOLDS has been appointed Eastern district manager of the Selden Truck Sales Company, of Rochester, N. Y. His territory includes the States of New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, and West Virginia. Mr. Reynolds is well known to the automobile trade, having been connected with the H. H. Franklin Manufacturing Company, of Syracuse, and the Lippard-Stewart Motor Car Company, of Buffalo, as sales manager.

W. C. PETTIT

W. C. PETTIT, former advertising manager of the Studebaker Corporation, has been appointed sales manager of the Commerce Motor Car Company of Detroit. Mr. Pettit's long acquaintance with the automobile trade and his extensive training in the motor car business will make him an invaluable man to the Commerce Company.

ROBERT M. BARKER, who has been advertising manager for the Chase Motor Truck Company, of Syracuse, N. Y., for the last two years, has resigned that position and accepted a similar one with the Palmer-Moore Company, of Syracuse.

JOSEPH A. ANGLADA, formerly president of the Anglada Company, of Detroit, manufacturer of demountable rims and automobile accessories, has resigned the presidency and sold his interests in the company in order to become interested in a concern which will manufacture a small car of his design.

GEORGE H. COX, assistant sales manager of the Thomas B. Jeffery Company, Kenosha, Wis., has resigned after eight years of service in the Jeffery Sales Department, first as salesman, later as superintendent of salesmen, and for the last three years as assistant sales manager. He has made no plans for the future, but will investigate several jobbing and distributing propositions before making any definite plans.

Trade Changes and Factory News

HATFIELD MOTOR TRUCK COMPANY, Elmira, N. Y., is considering moving its plant to Williamsport, Pa.

STANDARD MOTOR TRUCK COMPANY, Cleveland, Ohio, desires a new location and is looking for a site in Warren.

CONTINENTAL TRUCK COMPANY, of Denver, is looking over sites in St. Joseph, Mo., with a view to locating its auto plant there.

WHITE COMPANY, of Cleveland, Ohio, is again adding to its plant. The addition will comprise a one-story building, 30 x 200 ft.

INTERNATIONAL HARVESTER COMPANY is erecting the largest plant in the country devoted exclusively to motor truck building, at Akron, Ohio.

THE VICTOR MOTOR TRUCK COMPANY'S plant at Military and Beaver Roads, Buffalo, N. Y., has been secured by the Clover Leaf Milling Company, of Buffalo.

KALAMAZOO MOTOR VEHICLE COMPANY, Kalamazoo, Mich, manufacturers of motor trucks, has just moved into the building formerly occupied by the Clarige Foundry Company.

INTERNATIONAL MOTOR COMPANY'S plant at 532-40 Atlantic Avenue, Brooklyn, N. Y., has been sold. This building was occupied by the Mack Brothers Motor Company, a subsidiary concern of the International.

CHASE MOTOR TRUCK COMPANY, Syracuse, N. Y., will erect large factory for the manufacture of tractors. It will expend $150,000 in the new factory, which will be separate from that of the Chase Motor truck.

WAGENHALS MOTOR CAR COMPANY, of Detroit, was reorganized and its capital stock increased from $100,000 to $500,000. The new officers are: William Pflum, president; W. C. Wagenhals, vice-president and treasurer; Walter C. Turner, secretary. It is intended to increase the production of the car to 3000 for the coming year. The plant will be located permanently in Detroit.

SCHOEN-JACKSON COMPANY, Media, Pa., has discontinued making the Feps carburetor. The men originally interested in this device will take up the work. They are in touch with another company, and it is doubtful if there will be any halt in the production.

H. W. JOHNS-MANVILLE COMPANY, has arranged to take over the entire management of the Jones Speedometer Company. This will place the Jones Speedometer on sale by direct representation in forty or more cities in which the Johns-Manville Company has branch houses.

WILLYS-OVERLAND stockholders at the annual meeting held on October 28th, re-elected directors and officers as follows: John N. Willys, president; Isaac Kinsey, first vice-president; C. S. Jameson, second vice-president; R. R. Scott, secretary; Walter Stewart, treasurer, and A. H. Smith, comptroller. Board of Directors: John N. Willys, C. S. Jameson, Isaac Kinsey, Royal R. Scott, A. H. Smith, and Rathbun Fuller.

NATIONAL MOTOR TRUCK & MANUFACTURING COMPANY will not build a factory at Gibsonburg, Ohio. Officials of the company had selected Gibsonburg as the site of the company's plant, but when the stock selling campaign was begun a general indifference was exhibited which caused the resignation of Frank Lamb, who severed his connection with the Gramm Motor Truck Company, to become president and general manager of the new company.

REO MOTOR TRUCK COMPANY, Lansing, Mich., announced that the Model J, two-ton truck will hereafter sell for $1650 chassis only. The price of this vehicle was formerly $1800. Body prices remain the same. Following a declaration of a 7 per cent. dividend on the truck stock, it has been announced that 60,000 shares of the Reo Motor Truck Company's stock, which has been held by the Reo Motor Car Company, will be distributed to the stockholders the car company.

MOTOR TRUCK WEIGHT LIMITS IN NEW YORK STATE

New York State is now limiting the weight and speed of motor trucks upon its highways (a thing that heretofore has been done only by Massachusetts and Pennsylvania), by a set of rules and regulations promulgated by John N. Carlisle, Commissioner of Highways, which became effective on October 20th. However, it is not likely that the rules will have any great effect on the motor truck industry, for they limit the total weight of vehicles, inclusive of load, to 14 tons, and the weight on one axle to 8 tons, and the number of vehicles now in use in this State, which when loaded reach these weights, is practicaly insignificant.

The Highway Commissioner also limits the weight per inch width of tire and specifies that tires shall be smooth, and the weight of a vehicle shall not exceed 800 lbs. per inch of width without a special permit being obtained from his department. A graduated scale of speed limits is provided, as is also a limitation on the width of vehicle.

Conventions of Interest to the Trade

National

November 18-20—at Louisville, Ky. Maintenance of Way. Master Painters' Association; Secretary, Wm. G. Wilson, 149 Beacon Street, Middletown, N. Y.

November 18-20—at Marlin, Tex. Convention of Southwestern Ice Manufacturers' Association. J. C. Mitchell, Temple, Tex., Secretary.

November 20-21—at Buffalo, N. Y. Convention of American Specialty Manufacturers' Association. Iroquois Hotel. Stanley E. Hawkins, Buffalo, Secretary.

December 1-6—at Philadelphia, Pa. National Commercial Gas Association. Secretary, Louis Stotz, 29 W. 39th Street, New York City.

December 3—at Chicago, Ill. National Association of Furniture Manufacturers. Secretary, I. S. Linton, Ashton Building, Grand Rapids, Mich.

December 29-31—at Chicago. Great Northern Hotel. Seventh Annual Convention of the American Society of Agricultural Engineers. I. W. Dickerson, of Urbana, Ill., Secretary.

January—at New York City. Convention of National Association of Retail Shoe Dealers in conjunction with National Boot and Shoe Manufacturers' Association. A. S. Kreider, Annville, Pa., President.

January 14—at Hotel Astor, New York City. National Boot and Shoe Manufacturers' Association. Sol Weil, Secretary, Rochester, N. Y.

February—at Parkersburg, W. Va. Convention of West Virginia Retail Hardware Dealers' Association. Board of Commerce.

February 10-24—at Dallas, Tex. National Corn Exposition.

February 16-20—at Chicago, Ill. Tenth Annual Convention of National Association of Cement Users. Edward E. Krauss, Harrison Building, Philadelphia, Pa., Secretary.

April 22-25—at Savannah, Ga. Convention of National Drainage Congress. Edmund P. Perkins, Chicago, Ill., President.

State Conventions

November 17-22—at Columbus, Ga. Columbus Poultry Association will hold exhibition. John S. Jenkins, Secretary.

November 17-26—at Baltimore, Md. Maryland week celebration of State Horticultural Society. Lewis F. Kefauver, Middletown, chairman.

The list of conventions given herewith is published each month so that commercial car manufacturers can communicate with the proper authorities with the idea of arranging to give lectures, illustrated talks, statistics, etc., to show the advantage of motor trucks in these various lines; also possibly to show and demonstrate their cars.

November 26-28—at Darlington, S. C. The Eastern California Poultry Association will hold Poultry Show.

December—at La Crosse, Wis. La Crosse Wisconsin and Pet Stock Association will hold Annual Show.

December 2-4—at Antigo, Wis. Convention of State Dairymen's Association. Commercial Club preparing.

December 4-5—at Newton, Kans. Kansas State Good Roads Association.

December 9-12—at Philadelphia, Pa. Tenth Annual Convention of American Road Builders' Association, to be held at First Regiment Armory Building. E. L. Powers, 150 Nassau Street, New York City, Secretary.

December 9-13—at Harrisburg, Pa. Central Pennsylvania Poultry Association will hold exhibition; C. S. Smith, of West Fairview, is Show Superintendent.

December 10-12—at Milwaukee, Wis. Wisconsin Retail Implement and Vehicle Dealers' Association; G. F. Borchardt, South Milwaukee, Wis., President.

December 11-12—at Georgetown, Del. Delaware Corn Growers' Association will hold show.

December 11-20—At New York City. First International Exhibition of Safety and Sanitation, under auspices of the American Museum of Safety, 29 W. 39th Street, New York City.

December 24-27—at Minneapolis, Minn. Retail Hardware Association to convene, with exhibit in Armory Building. H. C. Roberts, of No. 1030 Metropolitan Building, is Secretary.

January 15—at Minneapolis, Minn. Winter Convention of Minnesota Retail Monument Dealers' Association.

January 20-22—at New Orleans, La. American Wood Preservers' Association.

January 20-22—at San Antonio, Tex. Annual Convention of the Texas Hardware and Implement Association.

January 20-23—at St. Louis, Mo. Missouri Retail Hardware Association Convention at the St. Louis Coliseum. F. X. Becherer, Secretary.

January 27-30—at Indianapolis, Ind. Retail Hardware Association Convention will be held at Tomlinson Hall. M. L. Corey, Secretary, Argos, Ind.

January 30-31—at Albany, N. Y. Retail Lumber Dealers' Association will convene at Ten Eyck Hotel.

February 4-6—at Milwaukee, Wis. Retail Hardware Association. Convention at Milwaukee Auditorium. P. J. Jacobs, of Stevens Point, Secretary.

February 9-14—at Baltimore. Retail Hardware Association of Maryland, Pennsylvania, Delaware and New Jersey will hold convention; W. P. Lewis, Huntingdon, Pa., is Secretary.

February 10-13—at Philadelphia, Pa. The Penna. Retail Hardware Dealers' Association will hold exhibition at Third Regiment Armory.

February 17-20—at Lincoln, Neb. Nebraska Retail Hardware Association. Nathan Roberts, Secretary.

February 17-20—at Rochester, N. Y. Retail Hardware Association of New York to convene and hold exhibit in City Exposition Building. John B. Foley, of Syracuse, Secretary.

February 18-20—at Fargo, N. D. Retail Hardware Association Convention. C. N. Barnes, Secretary, Grand Forks.

March—at San Francisco, Cal. Convention of California State Retail Dealers' Association.

March 2-5—at Boston, Mass. New England Retail Hardware Association. Convention and exhibit will be held in Horticultural Hall. D. Fletcher Barber, of this city, is Secretary.

March 3-5—at Sioux Falls, S. D. Retail Hardware Association of South Dakota. E. C. Warren, of Pierre, S. D., Secretary.

May 5-7—at Little Rock, Ark. Retail Hardware Association of Arkansas, to convene in this city. Grover T. Owen, of this city, is Secretary.

April—at Albany, N. Y. Convention of New York State Embalmers' Association. William S. Drinkwine, New York City, President.

July 7-9—at Raleigh, N. C. Retail Hardware Association of Carolina. T. W. Dixon, of Charlotte, N. C., is Secretary.

New Incorporations

Oneida Motor Car Company, Oneida, N. Y., has been incorporated with a capital stock of $10,000 to manufacture auto trucks.

American Motor Truck Company, Detroit, Mich., has been incorporated to manufacture automobile trucks, $5000. Principal stockholders are A. H. Reinhold and W. K. Ackerman.

McKaig-Hatch, Incorporated, Buffalo, N. Y., has recently been incorporated for the purpose of manufacturing drop forgings and combination pliers.

Standard Fender Company, Detroit, has been incorporated under Delaware laws with a capitalization of $250,000, to manufacture fenders and other metal articles.

Splitdorf Electrical Company of Detroit has been incorporated as a branch of the parent Splitdorf Electrical Company, of New York City. The officers of the new company are: C. E. Brelsford, president; H. J. Hinley, treasurer and manager, and W. J. Murray, secretary.

Standard Motor Car Company, of Minneapolis, recently formed with a capitalization of $6,000,000, is planning to erect a factory which will cost about $3,000,000. The new concern will make pleasure cars and light delivery cars. The output will be valued at about $5,000,000 per year. The men back of the project are: F. E. Kenaston, president of the Minneapolis Threshing Machine Company; M. J. Scanlon, S. H. Bowman, and P. M. Starnes, lumberman of national reputation. C. H. McNider, Mason City banker; W. C. Colby, of the Colby Company, and S. J. Beal, St. Paul, and F. E. Starnes, of Minneapolis.

Catasauqua Motor Car Works, Allentown, Pa., has been formed for the purpose of manufacturing a light motor truck. General repairing and repainting of all kinds of cars will also be done, all work being executed under a guarantee. The trucks manufactured by the firm will be of the latest type and the bodies will be built to suit all business purposes.

Fender on Standard Truck

This shows the fender which has been adopted as regular equipment on the Standard trucks, since the new ordinance, requiring fenders, went into effect in Detroit and Chicago.

London's New Cab

The latest innovation in London and which bids fair to rival the taxi

Steel and Rubber Markets

Crude Rubber Inactive

Rubber prices have dropped a few points since last month and the general conditions are quiet both here and abroad. Buying is limited to small quantities and speculation continues dormant. The quotation on Saturday, November 8th were:

Up-River—			
Fine	75	a	76
Coarse	46	a	47
Island Fine—			
Island fine	67	a	68
Coarse	28	a	29
Cameta	37	a	..
Caucho—			
Ball	45	a	..
Centrals—			
Corinto	42	a	..
Esmeralda	41	a	..
Guatemala, slab	40	a	..
Mexican—			
Scrap	42	a	..
Strips and scrap	46	a	..
Guayule	Nominal		
Balata, sh't	52	a	..
Ciudad, b'k	48	a	..
Trinidad, b'k	Nominal		
Africans—			
Massai, red	48	a	..
Red C'go	Nominal		
B'k C'go	48	a	..
Soudan—			
Niggers	Nominal		
Gambia, prime	45	a	..
East India—			
Sm'k, sh'ts	60	a	..
Ceylon bis. and sh'ts	52	a	53
Pale crepe	52	a	53
Pontianac—			
Prime plantation	6	a	..
Palembang	5	a	..

DOMESTIC SCRAP

Boots and shoes	7¾	a	8
Tires—			
Automobile	7½	a	7¾
Bicycle, pneumatic	4½	a	..
Wagon and carriage, solid	7⅛	a	8

Steel Prices Still Lower

The rank and file of consumers are still hesitating to buy liberally and railroads are buying intermittently. The industry is more or less depressed, prices are irregular and there is hesitation to act throughout the trade. The prices on November 8th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	22 00	a	....
Open hearth, per ton, mill	22 00	a	....
Sheet bars, per ton	22 50	a	....
Steel bars, soft base, half ex., tidewater	1 46	a	1 51

The above prices are at tidewater in carloads and larger lots. For quantities less than 2,000 lbs., but not under 1,000 lbs., $2.00 per ton additional is charged, and less than 1,000 lbs., $8.00 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2.00 per ton higher.

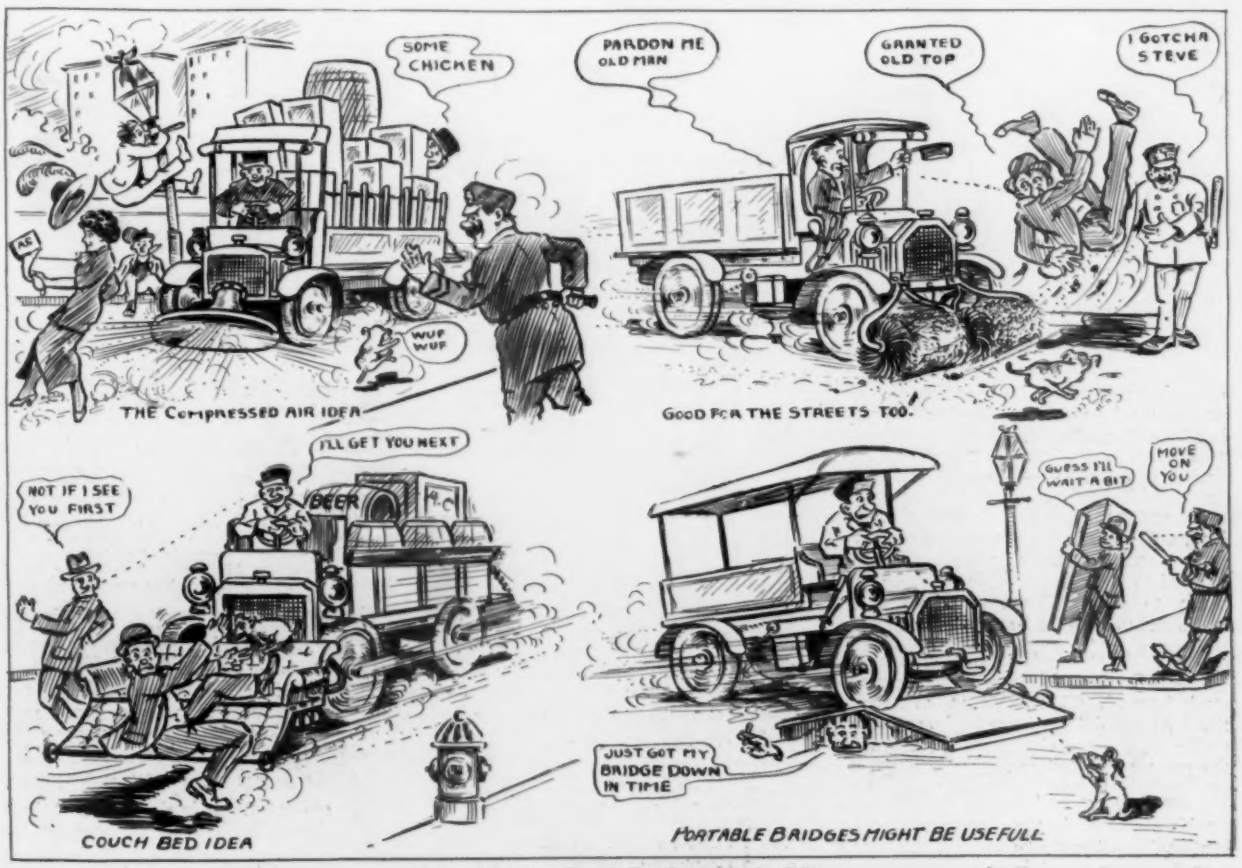
Gauge—	Black.	Galvanized.	Gauge—	Black.	Galvanized.
Nos. 22 & 24	1 75	2 10	No. 28	2 00	3 05
Nos. 25 & 26	1 80	2 80	No. 29	2 05	3 15
No. 27	1 85	1 90	No. 30	2 10	3 35

IRON AND STEEL AT PITTSBURGH

Bessemer iron	15 90	a16	40
Bessemer steel, f. o. b. Pitts	21 50	a22	00
Skelp, grooved steel	1 30	a 1	35
Skelp, grooved iron	1 55	a 1	60
Steel bars	1 30	a 1	35
Black sheets, 28-gauge	1 95	a 2	00

BACHMAN SPEAKS AT AUTOCAR MEETING

At an informal meeting of prospects, dealers and factory men, on Tuesday evening, November 11th, at the Autocar Sales Rooms, 23rd and Market Streets, Philadelphia, Mr. B. B. Bachman, assistant engineer of the Autocar Company, delivered a very interesting talk on the "Development and Construction of the New Autocar—Type XXI-F." He went into the matter of why this firm had adopted a 3000-lb. capacity car, a short wheelbase and body arrangement with motor under the seat. His arguments were illustrated by lantern slides from actual photographs. An informal entertainment followed.



Suggestions for Truck Fenders, by the Editor

Recently, in Chicago and Detroit, ordinances were passed requiring all trucks to be fitted with street-car type fenders. This appealed to the humorous side of our editor with the above result

Financial and Legal

CANADIAN STANDARD AUTO & TRACTION COMPANY, of Moose Jaw, Saskatchewan, has gone into involuntary bankruptcy. L. W. Pilliod has been appointed receiver. Liabilities are stated to be about $30,000.

STEPHENSON MOTOR TRUCK COMPANY, Milwaukee, Wis., has been thrown into bankruptcy by three outside creditors, who say that the concern on October 8th, admitted its inability to meet obligations and consented to bankruptcy. The claims of the petitioning creditors are small.

DAYTON AUTO TRUCK COMPANY, Dayton, Ohio, filed a voluntary petition in bankruptcy in the United States District Court, Dayton, Ohio. Liabilities are $216,165.77, and assets $67,720.28. R. T. Johnson, president of the company and largest of the unsecured stockholders, filed the petition.

DELIVERY SUPERVISION COMPANY, INCORPORATED, 733 7th Avenue, New York City, manufacturers of speed meters for motor trucks, has been filed against by Samuel S. Meyers, attorney for three creditors, the largest of whom is the American Taximeter Company, $44,329. William M. Lybrand has been appointed receiver. Liabilities are said to be $75,000 and assets $30,000. The company was incorporated in January, 1913, with a capital stock of $1,000,000.

EMIL GROSSMAN MANUFACTURING COMPANY, Brooklyn, N. Y., has recently acquired a part ownership in Patent 732,032, dated June 30, 1903, issued to William Barber, of Brooklyn, for a spark plug with an insulator consisting of a combination of porcelain and a less fragile substance. William Barber recently sued the Smith-Haines Company for selling V-Ray plugs, the Motor Car Equipment Company for selling Sootless plugs and the Lowe Motor Supplies Company for selling Red Head combination plugs. Naturally these companies, being jobbers, turned the matter over to the manufacturers for defense, the Lowe Motor Supplies Company turning the suit over to the Emil Grossman Manufacturing Company. Since the Grossman concern is now one of the owners of the patent, the suit against the Lowe Motor Supplies Company has been discontinued.

ALUMINUM CASTINGS COMPANY, Cleveland, O., has just placed upon the market a new aluminum truck wheel, which is claimed to show a saving in operating expense, to withstand the strain of heavy work, and yet weighs less than steel wheels.

KELLY REAMER COMPANY, Cleveland, Ohio, on October 20th increased its common stock from $25,000 to $50,000, to add facilities for its rapidly growing business. Practically all the new issue will be taken by the present stockholders.

HOLT CATERPILLER TRACTOR, a 60-h.p. gas machine, entered in the Argentine traction contest, has taken first prize, $15,000. This year American and foreign makers entered twelve tractors. This is the second year the Holt tractor has won this contest.

Communications Received

CRITICISM OF TRUCK SALES METHODS

By A BUSINESS MAN AND PURCHASER

We quote the following from a communication by B. A. Gramm:

"I had a matter come up the other day with the head of a very large concern that had purchased two of our trucks and had put them into service. On talking over the situation he stated that outside of liking our trucks very much, he was more than satisfied with the way the proposition was placed before him, and went on to say that in all his business career, which had been quite an extensive one, he never saw large corporations try to do business along such ruinous lines as the motor truck manufacturers were pursuing.

"He stated that as soon as he mentioned they were in the market for several motor trucks, he was besieged by representatives of different companies, and they represented the very best concerns that are to be found in business. Instead of these companies each one presenting their proposition in a clean-cut business way, such as any sensible machinery house would do, they changed their prices as fast as they thought the other fellow was giving something better, gave all kinds of guarantees he knew they could not carry out and offered to sell on any kind of terms; but worse than that, he stated that with the exception of one or two cases, the knocking that these men did to each other's goods was shameful, that if he himself had not believed that motor trucks were economical and useful in his business, that the very sales methods used by these different concerns would have prevented him from purchasing."

Now, I know personally that there is no use of the motor truck companies in America holding up a virtuous hand, saying it was the other fellow. We know positively that ninety-eight and a half per cent. of all the motor truck manufacturers in this country are guilty of these methods. Perhaps the head men in these companies are not doing it, but they are allowing their salesmen to do it, and the industry as a whole will suffer until they all get together in at least a yearly convention and learn to do business on business principles.

LETTER BY TRUCK TRANSPORTATION ENGINEER COMMENTING ON "HOW SHALL THE MOTOR TRUCK BE FINANCED?"

I have read Mr. Wagoner's article "How Shall the Motor Truck be Financed?" which appeared in "Business America," with considerable interest, and I am in accord with his views, with one or two exceptions.

I believe that a financing of motor transportation on the unit system—that is, retiring a corresponding number of animals—is unquestionably the only logical and economical plan for the comparatively small merchant and trader. But I believe—in fact, I am confident—that the economic waste incident to the horse delivery system by large users of horse-drawn equipment, is such that they can profitably replace all of their transportation equipment with motor trucks—not in one fell swoop, but in a gradual way covering a period of three or four years.

I maintain that, even in the largest corporations, the wholesale abandon of horse vehicles for motor trucks would cause a considerable loss. The reactionary effect from it would be so severe that in the long run, it would hinder rather than help the progress of motorized highway commerce. The reason is that nine-tenths of the present users of motor trucks do not use them with anything like 50 per cent. to 60 per cent. of their latent efficiency. Continuing for several years to appy the horse system to their motors, would result in loss and general disorganization and affect seriously their attitude towards the motor truck.

I agree with Mr. Wagoner that the popularity of public service transportation companies is very much in doubt. Loss of individuality would deter many merchants from adopting it, in spite of their being well aware that in the long run, they would make money from it. The loss of advertising of moving vehicles, on city streets bearing the firm's name, must be a factor which will militate against the popularity of the co-operative public service transportation idea.

This fact has already been proven in New York City and other large points where general trucking contractors have made comparatively little headway. On the other hand, this is a problem which can be readily solved by diplomacy, for if merchants have sufficient faith in motor equipment to lease a certain number of units, for a long enough period it will be to the interest of the general motor trucking contractors to put the individual name of their patrons on the vehicle in which the hauling is done. This, of course, is only possible where the haulage done by the patron is of sufficient volume to make it profitable for the truck contractor to individualize a certain number of units to each firm's service.

I regard the hostility of banks and financial interests towards loaning money to their customers for truck equipment, as one of the most serious detriments to the truck industry at this time. The reason is not very far to seek. Not enough educational work has been done by the truck industry for bankers to realize that the motor truck is really a practical transportation tool.

Bankers and financiers are the most ignorant class of business men in the whole world, on what highway transportation costs, and business man, not being able to give the banker any sufficiently comprehensive information himself for what his teaming work costs, the banker is by no means convinced from the mere statements of the customer that he wants to buy motor trucks, that he actually needs them. The banker's accountant or efficiency expert can go into the firm's establishment, and, after an investigation, determine whether an enlargement of the plant or the buying of new inside equipment, fixtures, etc., will pay a profit on the investment, as the firm's data on the cost of each department, profit and loss on the business done, is kept sufficiently accurate for him to reach definite conclusions.

When he reaches the transportation department, he is confounded with the lack of even approximate figures. Everything is guessed at, and where guess work instead of scientific accounting is practiced, no banker will speculate on something that he knows nothing about—that something being the cost of operating the motor truck—and the bankers who do know anything about motor trucks have the distorted idea that it is an experimental industry and that only wildcat promoters and speculators are engaged in it. The unsavory failures which have occurred in the manufacturing industry and which will occur in the next year or two, have turned buyers and bankers against the industry to an unfortunate extent.

I agree with Mr. Wagoner that the principle of approved credit is entirely applicable to the financing of motor trucks, and I see a great field for the traffic expert who, acting as the fiscal agent of the banker, goes to the firm asking for a loan to motorize its transportation, and diagnoses their problems, advising them as to kind of equipment needed, investment necessary, etc. At the present time, however, transportation experts (the few that there are) are much discredited individuals by both merchants and bankers.

The merchant and the banker, not understanding what transportation efficiency is, consider the outsider who attempts to analyze their requirements, as an interloper. In their judgment, the stable boss or the traffic manager, experienced only in horse delivery, are the only men who can advise them intelligently.

The whole problem reverts itself again to the necessity of educational work by the truck industry. If a co-operative campaign could be done on motor trucks by the gasoline, and electric manufacturers as well, in the course of a year or two, we might find that the attitude of the banker would be radically changed, for, sub-consciously, he would be forced to believe that we are in an industry that has a reason for its being, and that he is entirely unsophisticated in his attitude of prejudice towards lending money to his customers, who are sound business men, to motorize their transportation department.

The crux of the problem is educational. The quickest results of that education would come through the medium of printers' ink. As you are a seasoned advertising man, I am repeating an old saw in this statement, but I am convinced that it is the solution of the problem of the truck industry.

ROLLIN W. HUTCHINSON, JR.
Truck Transportation Engineer,
Packard Motor Car Company.

It is estimated that in the year 1918 there will be in use in the United States 300,000 commercial motor vehicles. By reason of their adaptability for city use, electric vehicles should constitute 65 per cent. of this total, or 195,000 machines.

THE COMMERCIAL CAR JOURNAL

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C. A. MUSSELMAN ..... Sec'y and Treas.

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GEORGE H. BUZBY	4315 Chestnut St., Philadelphia, Pa.
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Known bondholders, mortgagees, and other security holders, holding one per cent or more of total amount of bonds, mortgages, or other securities:

NONE.

(Signed) C. A. MUSSELMAN, Business Manager.

Sworn to and subscribed before me this 19th day of September, 1913

(Signed) HARRY SMITH, Notary Public.

(SEAL) (My commission expires February 21, 1915.)

Note:—In regard to Section 2 of the Act mentioned above, the Chilton Company does not accept payment, directly or indirectly, for any editorial or other matter printed as news.

IMPORTANCE OF THE COMMERCIAL CAR DRIVER NOT REALIZED BY USERS

IN OUR last issue we called the attention of the manufacturers to the importance of the commercial car driver to them. The success or failure of any standard make is acknowledged to be largely in the hands of the drivers, but it is not sufficient that the manufacturers alone realize the importance of the driver. The owner of the car or cars must also realize his importance.

For a truck user to employ a cheap driver is to exemplify the old adage. "Penny wise and pound foolish." The cheap, incompetent driver is not an economical man. For instance, not long since a firm in the laundry business figured that they could use to advantage a 1500-lb. vehicle. They calculated all the cost, repair bills, etc., and placed the wages of the driver at $12 a week, expecting to use a man who had been connected with them as a horse driver. This man was a flat failure, not because he was a horse driver, because many of them make excellent commercial car drivers, but because he was not suited for the work and was in every sense a cheap man. The very first move he made was to let the engine run dry, which cost the company $200 for repairs. Shortly after this he stripped the gears, and we might outline a series of heartrending disasters that followed before the owners woke up to the fact that he was the most expensive operator that they could have put on the car.

Just the other day the writer witnessed an example of what incompetent drivers are doing daily with valuable trucks. This driver came down a slight incline on a greasy asphalt pavement, his vehicle loaded with lumber which projected 10 to 12 ft. beyond the rear. The center of the street was cobblestone paved, under an elevated structure. This man, forgetting entirely the character of the street and his heavy overhanging load, suddenly applied the brakes in an attempt to turn into the car tracks under the elevated, locking the rear wheels, which slid for 25 ft. There could be but one result. Although the front end of the truck followed his steering, the rear end continued on down the street, thus heading the truck directly into one of the iron elevated structure supports with which it collided with great force, completely wrecking the cab, jamming in the heavy channel iron front of the frame which formed a buffer ruining the radiator and lamps and injuring the front of the engine. Four hundred dollars would probably not cover the damage done by this thoughtless and incompetent driver, who unquestionably went scot-free after reporting to his employer that the street was slippery and the truck skidded into a post.

Recently a furniture truck standing by the roadside was noticed by the writer. Its general slack and unkept appearance attracted attention. A glance beneath showed that the underpan had been removed; in fact, all the protection and coverings of the various parts of the mechanism had been stripped away, presumably so that some lazy driver could get at the parts without having to remove anything. Mud was thick everywhere, and when the truck was started, the grind and rattle showed conclusively that the parts were badly worn, due to being driven for months without protection.

It is not an uncommon sight to see thoughtless drivers, at a crowded corner, banging a heavily loaded truck right over a curbstone in order to pass obstructions or other vehicles. Although the springs may not break at the time or the tires be

cut, these parts will show the effect of the terrible impact sooner or later, often on a fairly smooth road. When parts break under these circumstances, that is, on a smooth road, the driver and owner, as a rule, unanimously blame the makers and charge them with defective parts.

How many cheap drivers realize that once heavily overloading a truck will completely ruin a set of tires, as far as their life is concerned? Even owners do not realize this and often allow an overload of a ton or more.

A driver of a three-ton truck hauling produce complained that with light loads the apples were bruised, owing to the stiffness of the springs. He briefly remarked that he would fix that all right by taking out a few leaves. The sequel was, as usual, the owner who employed this tyro soon had more than a set of springs to replace. One morning about three o'clock the truck struck a bad rut or ditch acrosss the road, which not only broke the front springs, but bent the axle backward and badly twisted the steering connections. The rear springs had already sagged, allowing the truck to hit the bumpers, seriously bending, from the continual pounding, the side frame members. In fact, to one conversant with the details, it was evident that the life of the truck had been shortened by several years. Lighter springs with properly arranged auxiliary springs might have been used if the driver had known his business and consulted with the makers.

Excessive driving in the car tracks with solid tired vehicles is common among ignorant or irresponsible men. The writer noticed a set of tires which had been cut away by car track driving until less than 1¼ in. remained of a 4-in. tire, and even this portion was ragged, yet this truck was daily loaded to capacity, although being driven on an entirely insufficient rubber cushion. No man in his senses would think of equipping the truck with tires only 2 in. wide, yet that is virtually what the truck was being driven upon to its detriment.

Loads only limited by the bridges, elevated structures or wires which the vehicles must pass, are commonly encountered. Is it any wonder that the long suffering truck goes to pieces under such treatment?

No locomotive, no piece of fine machinery, in fact nothing in the nature of an engine is abused to the extent of the modern commercial car. It is pounded over the roughest kind of cobblestone pavements at speed, the parts vibrating so that they look as if about to fly into pieces. They are packed with heavy material which overhangs the rear end many feet, and while thus loaded are swung around corners regardless of road conditions, wracking the wheel spokes and springs or skidding them into the curb if the road surface happens to be wet. Car tracks are crossed at speed even when projecting many inches above the road surface. Chuck holes and rocks of 6 or 7 in. in depth or height are struck squarely by reckless and careless operators, putting the wheels out of alignment if not actually breaking some of the parts. Excessive tire wear follows. Heavily loaded trucks are speeded up to their limit with governors detached or made inoperative by underhanded or ignorant operators.

The line of abuses to which the comparatively delicate machinery moving over uneven and almost impassible road surfaces is subjected is so large that we cannot begin to enumerate the items here, but we would like to impress this one point upon every owner—it is false economy to hire cheap and incompetent drivers. Better by far add $3 a week to his wages and get a good and reliable man than to withhold the $3 on his salary and pay $9 or $10 on needless repairs.

A STATEMENT OF PRESENT CONDITIONS IN THE COMMERCIAL CAR INDUSTRY WITH A RESUME OF THE CAUSES

HE present condition of the truck industry is a much discussed matter. That it is not what it should be, is conceded. The reasons for its state of comparative inactivity are, we believe, quite patent.

The truck industry has now reached the point in its development where a weeding out of the chaff is necessary, and this weeding out will of course be for the betterment of the industry as a whole.

Four Kinds of Manufacturers

There are several kinds of truck manufacturers; good sound business men, who went into the industry having previous knowledge of conditions; those who had but slight knowledge of conditions, less capital and little business ability, but were sincere in their manufacturing intentions; those who through ignorance believed it a game in which to get rich quickly, and those who are really not legitimate manufacturers at all, but merely promoters and stock jobbers.

Naturally, of these four classes only the first is eligible for continued membership in the manufacturers' group. Nevertheless, the others have been with us in ever-increasing numbers, producing trucks to a limited extent, and in direct proportion as they produced cars, making it more difficult for the real manufacturer to dispose of his product.

Too Many Inferior Cars

Each of these illegitimate manufacturers, if we may be permitted to use the term, has foisted on the public these trucks, which of necessity they had to build in order to carry out the stock jobbing or promotion scheme at heart. This caused the market to be flooded with good, bad and indifferent products which had to be sold at any price. In the meantime, more and more companies with much paper and little real capital were incorporated, organized, and began turning out trucks onto the already well-stocked market.

Just at this time, to make matters worse, the rapidly increasing demand for trucks began to slacken, then decline, and finally almost stopped, although the entire business world now recognizes truck efficiency and economy. These contradictory conditions were brought about largely by politics and the business unrest which always accompanies tariff changes.

Cut-Throat Sales Methods

It was soon found that something strenuous had to be done at once in order to move the mass of cars which were flooding the market. This naturally led to the same things which have happened in almost every growing industry, and will happen again in other lines before they have gone through the housecleaning or weeding-out process, namely, price-cutting, special inducements, taking of notes without sufficient security, excessively long time payments, secret concessions, and all the long list of petty undercutting which makes the sale of trucks excessively difficult for the legitimate and honest maker. In fact so many firms have entered into the business, so many firms without proper knowledge or suitable backing, we might say mushroom companies, that even established reputable manufacturers have allowed their salesmen either unknowingly or intentionally to be drawn into the maelstrom of cut-throat sales practices.

Effect of the Sporting Element

The automobile industry, as is well known, has suffered from the sporting element which has been attracted to it. This is more true of the pleasure car end than with commercial cars, but as many of the manufacturers are building both, it has had its effect on the truck branch of the business. Things have been carried on with a high hand by the young bloods in more than one quarter, adding expense upon expense to the cost of manufacturing and also to the cost of selling. Extravagance has been more or less universal, augmented perhaps by the feeling that it was impossible to supply the demand for vehicles and that there was plenty of money pouring into the industry. The resulting needless waste of funds has gradually had its undermining effect, and those concerns most guilty, among which are some of the largest combinations of capital, are now to reap the harvest which they have sown.

Ignorance of the User a Barrier

The producing end of the business has also overlooked an almost insurmountable difficulty which is now staring them in the face. The sales end has recognized to a certain extent that this difficulty existed, but has not arisen to the occasion. We refer to the ignorance of the user. This fact alone looms large on the horizon as a barrier to ready sales. The industry is at last brought face to face with the fact that the mass of users and prospective users of trucks are steeped in horse knowledge only; that they are not in any sense machinery users, and therefore the difficulty of most importance is the herculean task of educating them. This is undoubtedly the rock on which the ship of the automobile manufacturer splits. It is the primary cause of the tremendous expense of the service department which has been eating up the profits. Could any more wasteful method be devised than to place an expensive piece of machinery in the hands of an incompetent, careless and indifferent operator, and then organize and maintain an elaborate service department to keep the machine from going to pieces under his abuse? Yet this is precisely what the manufacturers and agents are doing. The problem is, then, one of education. But how can the manufacturer educate the user to an understanding of entirely new conditions—a wagon, a common ordinary wagon with two axles, four wheels and box body, replaced by a complicated piece of mechanism of which he knows nothing? Even worse than this, for in most instances the user knows nothing of any kind of machinery and is not in any way suited, until further enlightened, to handle even the simplest mechanism. The question is then, how is it possible for the automobile manufacturer to educate these users, and do it with such economy that he can still sell his product and make a living?

We have suggested as a remedy the combined accumulative and co-operative efforts of the manufacturers, dealers and agents in the various cities, through special schools for drivers and owners; but more of this at another time, as this is only one of many causes.

The Banks Withdraw Support

The various circumstances which we have enumerated have continued, gradually going from bad to worse, and aggravated by general business conditions, until the banks, which have without question been carrying many of the automobile firms, sensing the unsound financial situation, closed down sharply and without warning on automobile credit. This can result in but one and the usual end: the unsound financially, the promoters, speculators, the weaker, and we may say less desirable, element in the industry will be forced out, thus clearing the sales atmosphere, so that the legitimate manufacturers, who have not built too heavily on other men's capital, who have managed conservatively and who have built a worthy product, will again find a market free from the undesirable element in competition. This clearing of the automobile industry of the weak, the unbusinesslike, the speculative and stock-jobbing element will be the greatest boon that could possibly happen to the real makers.

The present is a transition state in the history of commercial car progress, which comes to practically all growing industries. It may be termed the "house-cleaning" period, and we welcome this stage of renovation for the good it will do the future of the industry. Conservative business methods must now replace the lavish, haphazard, go-as-you-please methods which have already for too long held sway.

Unfortunately, however, there must always go down with the undesirable ones a few who by reason of insufficient capital, or owing to the inopportune time of their advent in the field, are not able to withstand the strain of such a cleaning-out period.

The Future

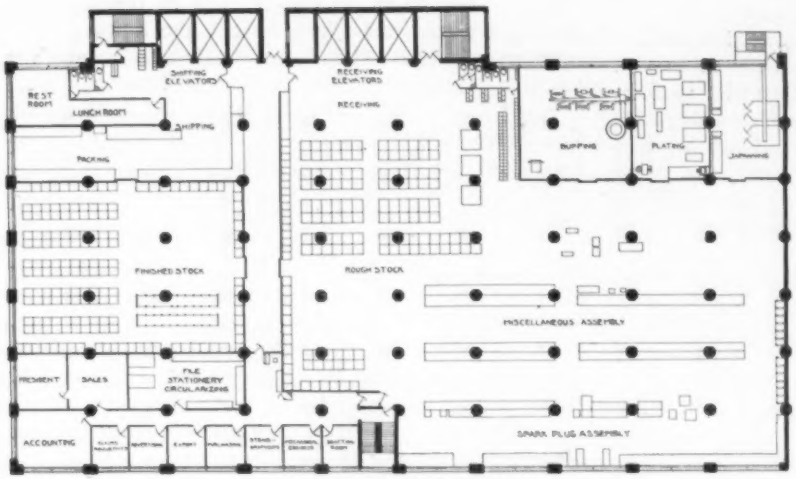
As to the real and ultimate end of the truck business there is no possible question. It is a well-recognized fact that the economy of motor-driven vehicles over horses is epoch-making, wherever commercial cars are properly handled and are at all suited to the required service. Business men everywhere are planning for increased fleets or for the introduction of power-driven vehicles, just as soon as they can see their way clear to finance the new equipment. For the manufacturers who weather the present unsettled conditions there is a sure and prosperous future in store.

PRESIDENT MARMON HONORARY MEMBER OF THE I. A. E.

At the meeting of the Council of the Institute of Automobile Engineers, held October 9, 1913, Mr. Howard Marmon, President of the S. A. E., was elected the first honorary member of the Institute of Automobile Engineers.

The Retail Merchants' Association, of Washington, D. C., is negotiating with a large trucking concern in Baltimore for the establishment of a motor truck freight service between Baltimore and Washington. The Pennsylvania and B. & O. railroads, in refusing to continue the free delivery of freight from their terminals to the doors of their consignees, have made this move possible. A hearing is soon to be had before the Interstate Commerce Commission. In the meantime a proposal has been made by the trucking concern to the shoe section of the Retail Merchants' Association, and the matter referred to the association. The manager proposes to have two or four trips a day, and when the business is well established he can give them more efficient and economical service than the railroads.

Motor Trucks will be one of the features of the exposition to be held in Dusseldorf, Germany, in 1915. The fair will be devoted to the exposition of the progress in "100 years of culture and art." It will be devoted to the depiction of the accomplishments in commerce, science, art and industry. The greatest progress to be noted in the last century is in the field of transportation, and therefore will have a prominent place in the exhibition. The motor truck is one of the most prominent developments.



Grossman's New Factory

Layout of plant and offices of the Emil Grossman Manufacturing Company, Inc., Bush Terminal Building, Fourth Street and Second Avenue, Brooklyn, N. Y.

THE GENERAL TRAFFIC DEPARTMENT of the Automobile Chamber of Commerce, New York City, has issued the following circular:

Referring to our Circular No. 11, Tariff applying to California terminals has now been issued to take effect December 1, 1913, and reads as follows:

	Group A.	Group B.	Group C.	Group D. E. F. G. H. J.
Vehicles, Freight, Self-Propelling, N. O. S. (not including Delivery Wagons with closed tops), Chassis for such vehicles, and Tractors, and extra parts (finished or unfinished), but not including extra Wind Shields, Lamps, Searchlights, Head lights, Speed-meters, Cyclometers and Horns, minimum C. L. weights: 36 ft. car, 12,500 lbs.; 40 ft. car, 12,500 lbs.; 50 ft. car, 15,000 lbs.	$2.80	$2.70	$2.60	$2.50

NOTE.—In no case shall the charge for a carload shipment of Self-Propelling Freight Vehicles handled under rates named in this item exceed the amount charged for a carload shipment of Self-Propelling Passenger Vehicles of like weight.

The effective date of the new rates to North Pacific Coast points has not yet been announced.

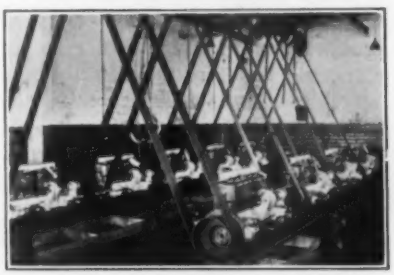
NEW F. & S. BALL-BEARING LIST

A new booklet which cancels all previous lists on F. & S. annular ball bearings is now being mailed to the trade. The various types are illustrated, including the light, medium and heavy series, also the narrow types, and dimension diagrams are presented. Each bearing is listed, giving the outer diameter, bore and width, ball diameter and number of balls. The load-pounds given are the highest proper for steady loads and speeds.

The dimensions are given in millimeters, but a table of inch equivalents is included, making it a simple matter to convert the measure. Special tables will be supplied on request for other speeds and loads, and for extra sizes where their use is indicated. The single annular type, fitted with the narrow ribbon ball separator and the W. H. narrow with ball separator are well known to the trade and the data on these will be of service to the garage, repairman and service station, as sizes and prices have been revised to September 1st. It is being published by the J. S. Bretz Company, 250 W. 54th Street, New York City, sole importer of these bearings.

BELGIAN GOVERNMENT TO USE TRUCKS

Consideration is being given by the Belgian Ministry of Railways to a proposition to modernize the methods of freight delivery. This delivery service has each year been awarded by contract, the contractors supplying the necessary vehicles, horses, etc. It is now proposed to substitute motor trucks for horse drawn vehicles in all future contracts for this service, because of the great increase in freight hauled. At first experiments will probably be made with trucks serving exclusively for the delivery of express packages under the classification "Tariff I." Truck service will be extended to the delivery of all packages in the railway freight department if the results justify such action. It seems likely that tenders will shortly be made for this contract by several bidders, and it might be advantageous for American manufacturers of motor trucks suitable for express deliveries and sold at a fairly reasonable price to forward circulars and price lists. (Three addresses to which these circulars may be sent will be given on request to the Bureau of Foreign and Domestic Commerce, Washington, D. C.)



Running in "Continental" Motors

The illustration shows one corner of the "running-in" room at the Continental Motor Manufacturing Company's plant. The motor runs as a unit, being driven by belts from shafting and flooded with oil to thoroughly work in all the bearings, pistons, cylinders, etc. Each motor is run for three hours, at 240 r. p. m. In this way the pistons, rings, and cylinders are lapped and all microscopic projections worn down to a smooth, hard wearing surface.

Motor Truck En Route to Reopen Abandoned Mine

The Almeda mine, located on Rogue River, Josephine County, Southern Oregon, which was seventeen miles from the nearest railroad station, and on a very narrow and bad road, was abandoned because the ore could not be hauled profitably, although the mine was rich. Afterwards the owner decided to try motor truck transportation and purchased a five-ton machine. On the first trip, county representatives were taken along, and after seeing that the truck could operate on the road in its very poor condition, they pledged their support in bettering the road. A fleet of the trucks will be operated and the mine will be made a paying proposition.

MOTOR TRUCK SHOW TO BE HELD AT LOS ANGELES, NOVEMBER 17-22

The first motor truck show to be held on the Pacific Coast will be held in Los Angeles, California, during the week of the 17th. The show is unanimously endorsed by the commercial car dealers, and is to be managed by Walter Hempel. The educational features will be an important part of the show. These will embrace lectures on motor truck economy and a school for drivers. There will also be a number of contests for stock models of trucks exhibited, including a 24-hour non-stop run; a hill climb, a fuel economy contest, and a cost per mile, with capacity load, contest. A committee of the Motor Truck Club, of California, will supervise all the contests.

NO COMMERCIAL CARS AT PHILADELPHIA SHOW

The management of the Philadelphia Automobile Show, to be held January 10 to 17, has announced that there will be no commercial cars on exhibition. This follows the precedent established by the national shows at New York and Chicago.

GOODRICH PROTECTS DEALERS

The B. F. Goodrich Company, Akron, Ohio, announces that all dealers handling its goods, and who have purchased casings and tubes of that brand on and after the first of November, will be protected against shrinkage in value caused by a reduction in prices made by the company, provided that, at the time the reduction is made, the goods are still in the dealer's hands. Should a reduction occur, a credit memorandum for the amount of the difference in prices caused thereby is added to the dealer's account.

GENERAL MOTORS TRUCK COMPANY is considering building an immense service station at W. 26th Street, New York City. The offices now located in the present 59th Street building will be moved to the new building when completed.

THOMAS B. JEFFERY COMPANY'S San Francisco branch has been taken over by Joseph J. McMullen, who has been associated with the branch for several years. The business will be continued under the name of the Jeffery Auto Sales Company.

STEGEMAN MOTOR TRUCK COMPANY, of New England, with service station at 922 Commonwealth Avenue, Boston, Mass., has been incorporated to handle Stegeman trucks in that territory. Messrs. Frank R. and Richard A. Brine are the incorporators.

Personal Items

ALVAN T. FULLER, Boston distributor of the Packard line, recently bought the Packard agency at Albany.

GEORGE W. BROWNE, formerly located at 458 Milwaukee Street, Milwaukee, Wis., has moved to new building at Broadway and Biddle Streets.

J. V. HARDING, formerly manager of the Detroit branch of the Motz Clincher Tire & Rubber Company, has been appointed sales manager of the company.

W. J. MCDOWELL, who for several years past has been with the General Vehicle Company, has joined the sales force of the Chicago branch of the General Motors Truck Company.

CHAS. FISHER, formerly with the Universal Motor Truck Company, has been appointed Eastern District Manager of the Mogul Motor Truck Company, with headquarters in New York City.

R. A. BRINE, manager of the Columbia Tire & Top Company, Boston, Mass., has secured the Stegeman line of commercial cars. He has a finely appointed service station and salesroom at 922 Commonwealth Avenue.

A. T. SMITH

A. T. SMITH, formerly of Chicago, has been named manager of the local branch of the Firestone Tire and Rubber Company, to succeed R. D. Barr, who was killed in an automobile accident in July. The new manager has spent considerable time at the Firestone factory in Akron familiarizing himself with every detail of the tire business. Smith has been with the Firestone Company for years.

E. S. RICKEL, for many years representing the Diamond Rubber Company, has become Michigan branch manager of the Swinehart Tire & Rubber Company, of Akron, Ohio.

WILL H. BROWN, in assuming his new duties as general sales manager of the Indianapolis branch of the Cole Motor Car Company, announces that the Brown Commercial Car Company will continue business as usual, with offices and service station at 425 N. Meridian Street, Indianapolis.

AUTOMOBILE SHOWS AT WHICH COMMERCIAL CARS WILL BE EXHIBITED

November 22-29—Providence, R. I. Rhode Island Automobile Dealers' Association. Armory. Percival S. Clark, manager, 78 Matheson Street.
November 24—Savannah, Ga. Savannah Auto Dealers' Association.
December 6-13—Toledo, Ohio. Toledo Factories Building. Toledo Auto Shows Company. J. G. Swindeman, president, 231 Superior Street.
January 9-17—Manchester, England.
January 10-16—Milwaukee, Wis. Auditorium. Milwaukee Auto Dealers' Association. Bart J. Ruddle, manager.
January 10-21—Brussels, Belgium. Chambre Syndicale de l'Automobile et du Cycle de Belgique.
January 12-17—Bridgeport, Conn. State Armory. B. B. Steiber, manager, Room 22, 925 Main Street.
January 19-24—Washington, D. C. Washington Automobile Dealers' Association. T. Oliver Probey, president.
January 24-31—Rochester, N. Y. Exposition Park. Rochester Automobile Dealers' Association. C. A. Simmons, manager.
January 24-February 7—Montreal, Canada. Drill Hall. Montreal Motor Trade Association. W. P. Kearney, president, 782 St. Catharine, West.
January 26-31—Scranton, Pa. Armory. H. B. Andrews.
January 31-February 7—Minneapolis, Minn. Minneapolis Auto Trade Association. F. E. Murphy, Secretary. National Guard Armory.
February—Hartford, Conn. Hartford Auto Club. F. Dart, chairman, care of Palace Auto Service Company.
February—Elmira, N. Y. Automobile Show. Frank D. Pratt.
February 7—Omaha, Neb. C. G. Powell, Secretary, 2119 Farnam Street.
February 9-14—Buffalo, N. Y. Buffalo Auto Dealers' Association. J. J. Gilson, 401 Franklin Street, Secretary.
February 16-22—Kansas City, Mo. New Convention Hall. Kansas City Motor Car Dealers' Association. E. E. Peake, Secretary, 909 Gloyd Building.
February 18-21—Bloomington, Ill. McLean County Auto Club.
February 21-28—Newark, N. J. New Jersey Automobile Exhibition Company. H. A. Bonnell, manager, 1022 Kinney Building.
March—Grand Rapids, Mich. *Grand Rapids Herald*. Klingman Furniture Building.
March—Harrisburg, Pa. Chestnut Street Auditorium. Harrisburg Auto Dealers' Association.
March—Wichita, Kans. Wichita Business Association.
March 2-7—Fort Dodge, Ia. Fort Dodge Auto Dealers' Association Auditorium.
March 3-14—Tiffin, Ohio. Auditorium. E. T. Rodgers.
March 17-21—Boston, Mass. Boston Commercial Motor Vehicle Association. C. I. Campbell, Secretary.
April 9-16—Manchester, N. H. Mechanics' Hall. D. F. Sullivan.

AGENCY OPPORTUNITIES

[In this section, each month will be listed the open territory of leading commercial car manufacturers. This affords an opportunity for dealers or those wishing to take on agencies, to learn which makers are seeking agents in their vicinity. — EDITOR.]

STEGEMAN: Stegeman Motor Car Company, Milwaukee, Wis. Open territory in Denver, Colo.; St. Louis, Mo.; Kansas City, Mo.; Ohio, Pennsylvania and the Pacific Coast.

STEWART: Stewart Motor Corporation, Buffalo, N. Y. Open territory in Kansas City, Mo.; Memphis, Tenn.; Nashville, Tenn.; Atlanta, Ga.; Milwaukee, Wis.; Birmingham, Ala.; Louisville, Ky.; New Orleans, La., and Richmond, Va.

MONITOR: Monitor Automobile Works, Chicago, Ill. Open territory in San Francisco, Cal.; Atlanta, Ga.; Louisville, Ky.; Boston, Mass.; Minneapolis and St. Paul, Minn.; St. Louis, Mo.; New York City; Philadelphia, Pa

B. A. GRAMM'S TRUCKS: Gramm-Bernstein Company, Lima, Ohio. Open territory in Kansas, Nebraska, Oklahoma, Colorado, Wyoming Florida and certain portions of Illinois, Indiana, North Carolina, South Carolina, Virginia, Pennsylvania, Maryland and West Virginia.

GARFORD: Garford Company, Elyria, Ohio. Open territory in Nevada, Idaho, Montana and Wyoming.

BEST AND FLINT: Durant-Dort Carriage Company, Flint Motor Wagon Department, Flint, Mich. Open territory in all states excepting Iowa and Texas and a few counties and towns in the Central and Eastern States.

WICHITA FALLS: Wichita Falls Motor Company, Wichita Falls, Tex. Open territory in Kentucky, Tennessee, Alabama, Georgia, Florida, Montana South Dakota, North Dakota and northern Mississippi.

ROWE: Rome Motor Manufacturing Company, Coatesville, Pa. Open territory anywhere excepting New York City, New Jersey, Eastern Pennsylvania, Delaware, Maryland and District of Columbia.

LIPPARD-STEWART: Lippard-Stewart Motor Car Company, Buffalo, N. Y. Open territory in Kansas City, Mo.; Milwaukee, Wis.; Cleveland, Ohio; Memphis, Tenn., and Philadelphia, Pa.

KELLY: Kelly-Springfield Motor Truck Company, Springfield, Ohio. Open territory in Albany, N. Y.; Utica, N. Y.; Salt Lake City, Utah; Atlanta, Ga.; Washington, D. C.; Jacksonville, Fla.

REPUBLIC: Alma Motor Truck Company, Detroit, Mich. Open territory in New England States, Rochester, N. Y.; Philadelphia, Pa.; Kansas City, Mo.; Louisville, Ky.; St. Louis, Mo.; New Orleans, La.; Milwaukee, Wis.; Indianapolis, Ind., and Des Moines, Ia.

STANDARD: Standard Motor Truck Company, Detroit, Mich. Open territory in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kansas, Arkansas, Oklahoma and certain parts of New York, Pennsylvania, Wisconsin, Virginia, Iowa and Ohio.

KOEHLER: H. J. Koehler Sporting Goods Company, 1709 Broadway, New York City. Open territory in San Francisco, Cal.; Portland, Ore.; Omaha and Lincoln, Neb.; Atlanta, Ga.; New Orleans, La., and Galveston, Tex.

New Agencies and Branches

FISHER & WILSON, located in High-Seventh Garage, Columbus, Ohio, have taken the agency for the Dart truck.

LIPPARD-STEWART MOTOR SALES COMPANY has leased offices in the United States Rubber Building, Broadway and 58th Street, New York City.

CHASE MOTOR TRUCK COMPANY, Charlotte, N. C., has been formed for the purpose of selling and distributing Chase motor trucks by G. H. Marvin and J. L. Snyder.

AVERY, F. E., 1199 Franklin Avenue, Columbus, Ohio, has changed the name of the company to F. E. Avery & Son, and has taken the agency for the Stewart truck.

THOMAS B. JEFFERY COMPANY'S Milwaukee branch has been taken over by the Reeke-Osmond Motor Car Company, who will control the State of Wisconsin and upper Michigan on Jeffery pleasure cars and trucks. A sales and service station will be operated for these makes exclusively.

FIRESTONE TIRE & RUBBER COMPANY, Akron, Ohio, has opened new branches in Rochester, N. Y., and Des Moines, Ia. The latter place will be a distributing point for Firestone products for Iowa, part of Minnesota and part of Mississippi. The Rochester branch will be a service station in the same respect as the Des Moines branch. A large stock of tires and rims will be carried for local use.

KOEHLER, H. J., S. G. COMPANY, Newark, N. J., has made arrangements with J. J. Chedraui, of Monte Lebano, Syria, to handle the one-ton Koehler truck. Twelve trucks are now en route for that latter place, and the Koehler will be the first commercial car to be operated there.

WILCOX, H. E., MOTOR CAR COMPANY, Minneapolis, Minn., has opened an agency at 1708 N. Charles Street, Baltimore, Md., known as Howell's Wilcox Trux Sales Company. This will be known as No. 1 branch, and a Wilcox service station No. 2 will shortly be opened down-town, most likely in the wholesale district.

DIVINE MOTOR CAR COMPANY, 2430-32 Michigan Avenue, Chicago, Ill., has been taken over by the Garford Company, and will hereafter be operated as a branch by T. J. Edwards, under the name of the Garford Motor Car Company. Mr. Edwards, who has been with the Garford Company for several years, is looked upon as a man who thoroughly understands the details of the motor truck business. E. C. Divine, president and founder of the Divine Motor Car Company, has retired from the motor business, and will probably spend the winter in California.

GRAMM MOTOR TRUCK COMPANY OF CANADA, Walkerville, Ont., has announced that it will place on the market in 1915 a gas-electric truck.

MORELAND MOTOR TRUCK COMPANY, Los Angeles, Cal., owing to the steadily increasing demand for commercial cars of the lighter type, has added to its line a 1000-lb. light delivery truck.

VICTOR MANUFACTURING & GASKET COMPANY, Chicago, Ill., has added to its business a Brass Foundry for producing brass and aluminum, bronze, or any other kind of castings a brass foundry is capable of doing, with first-class equipment. The company is able to quote very interesting prices on any kinds of castings for both the automobile industry and engine builders, on account of having a large amount accumulated of the purest copper and brass, which comes from the gasket manufacture. In keeping with the company's policy, the prompt delivery and low prices, for which it has been noted in the past, will apply to the new line.

Portable Supply Store

The Gibney Motor Supply Company, Philadelphia, Pa., uses this Ford car, fitted with a special body, which carries a complete line of samples of the various auto supplies which interests the garageman. With this car the company's agent visits the Philadelphia garages once a week. A second vehicle is being constructed for suburban work.

The Los Angeles Motor Truck Club

A "Live Wire" Association of Truck Owners and Dealers

THE second Motor Truck Club in the United States is in Los Angeles, and it is decidedly a "live" organization of truck owners, dealers and manufacturers. It was organized August 8, 1912, and now has a representative membership of 650 with an active membership of 100. Los Angeles with its 60 truck agencies, 5 factories and about 2000 commercial vehicles in operation has need of an association of this character in order to protect the interests of all concerned in the manufacture, sale and operation of motor trucks, and the Club has "made good" under the leadership of President W. F. Wood and Secretary George B. Harrison.

The activities of the organization are indicated by the various committees, which are listed with the chairman of each; all of them representative men in the motor truck world. They are as follows: Welfare of the Club, W. F. Wood; Finance, R. H. Stevenson; Harbors and Roadways, W. E. Barnes; Legislation, George B. Harrison; Taxicabs and Rental Cars, H. L. Weisbaum; Membership, M. S. Bulkley; Programs, C. R. Teaboldt.

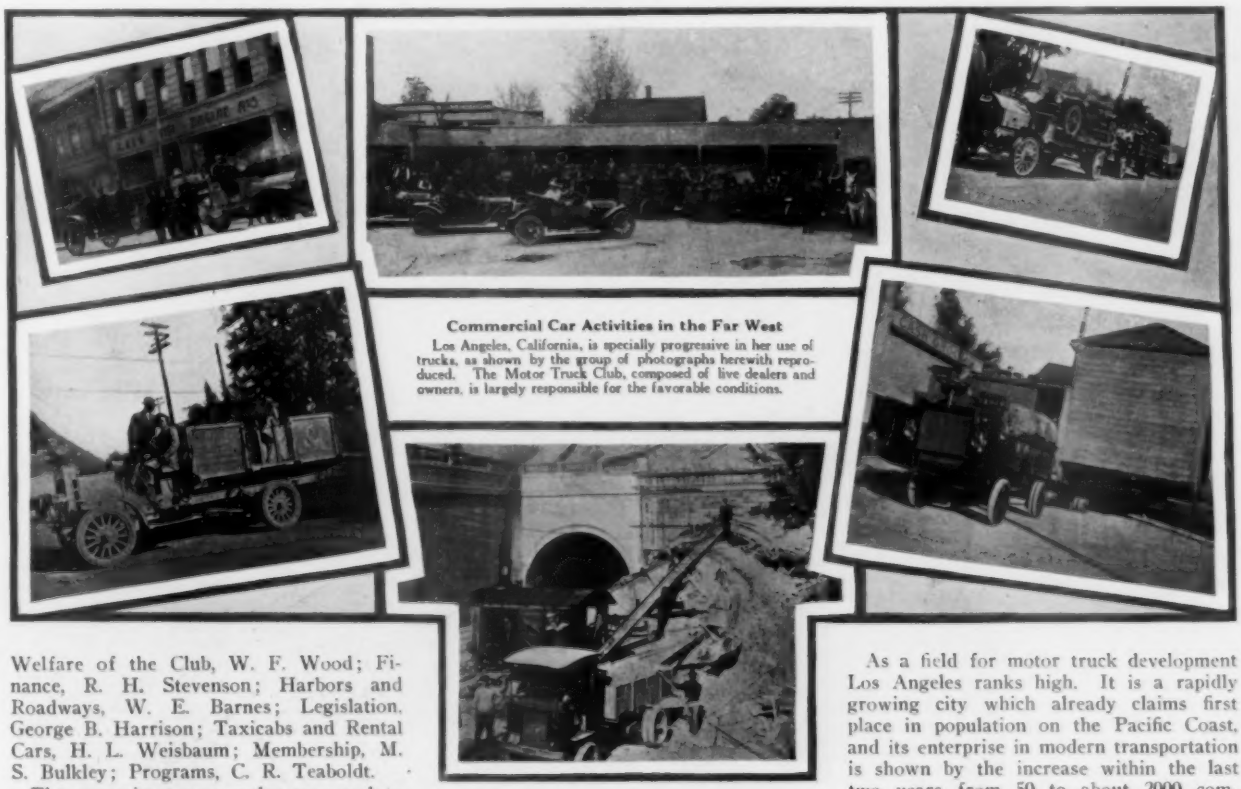
The campaigns now under way and to some extent successful are for a commercial highway between the city and Los Angeles Harbor, a distance of a little more than 20 miles. This is the extensively improved harbor of San Pedro, now annexed to the city, and although it is connected with the business section by a good boulevard for pleasure cars, the foundations of that road are declared insufficient for the heavy motor traffic. The club proposes to have a highway constructed with concrete foundation, especially adapted for the heavy hauling of lumber and other building material, and for merchandise which may be delivered directly from the ship to the motor truck and conveyed with no re-handling to the wholesale district.

With the opening of the Panama Canal, the commerce at this harbor will increase tenfold, and the railroads will have difficulty in handling it. The saving to the merchant by this use of motor trucks will eventually run into millions. One lumber company that makes use of the present boulevard claims that it makes a saving of a dollar on every thousand feet of lumber handled by commercial vehicles. As this is a great lumber port, the highway would be worth while for this trade alone.

Another plan urged by the club with good prospects of success, is the installation of special truck facilities at freight stations and docks and equal access at the port with steam and electric freight carriers.

The question of grade crossing and proper regulation of highways crossed by the steam and electric roads is being handled by the Motor Truck Club, and measures for the elimination of unnecessary congestion and for the proper guarding of grade crossings are being taken. In this connection, all cases of carelessness on the part of chauffeurs and motormen or locomotive engineers are followed up by the club, with the object of weeding out the men who are habitually careless.

There is a local campaign on at present to prevent unjust taxation of motor trucks and to do away with the duplication of licenses which at present obtains. Los Angeles is the business center for more than a score of incorporated towns, and at present the owner of a commercial car serving patrons in any of these cities may be required to take out a license in each. This would make a prohibitive taxation if it were carried out to its logical conclusion and the legislative committee is engaged in framing a system of reciprocity; the holder of a license in any one city being allowed to do business in any of the others.



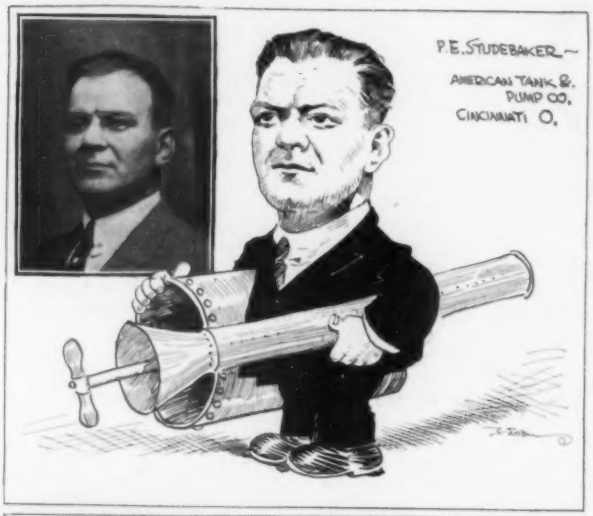
Commercial Car Activities in the Far West

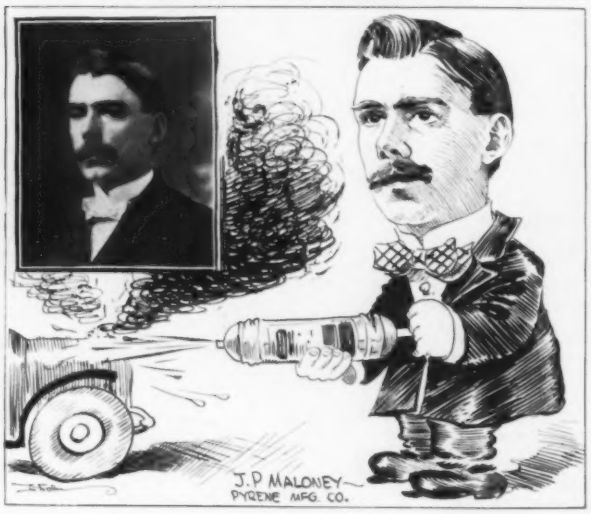
Los Angeles, California, is specially progressive in her use of trucks, as shown by the group of photographs herewith reproduced. The Motor Truck Club, composed of live dealers and owners, is largely responsible for the favorable conditions.

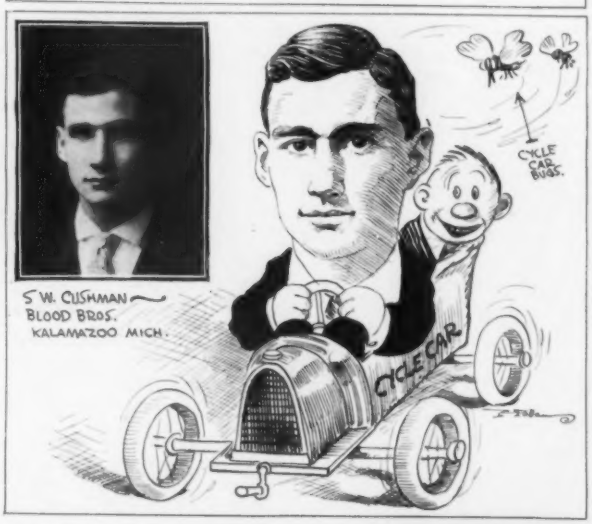
As a field for motor truck development Los Angeles ranks high. It is a rapidly growing city which already claims first place in population on the Pacific Coast, and its enterprise in modern transportation is shown by the increase within the last two years from 50 to about 2000 commercial vehicles. Its fire department will soon be completely motorized according to the plans of Fire Chief Ely, and already its equipment ranks second in value to New York City.

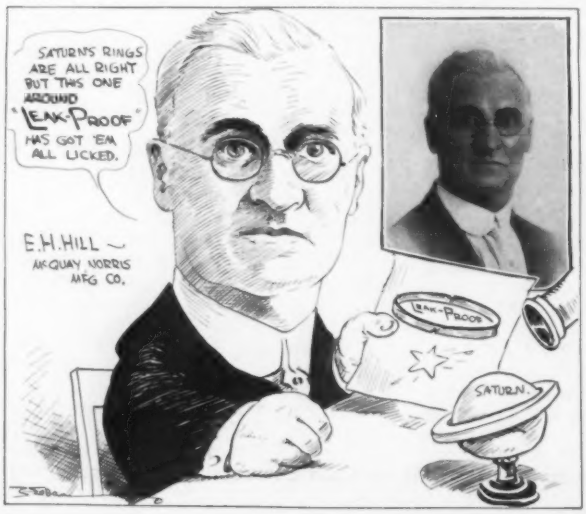
In such an environment an organization like the Motor Truck Club of California (the name indicates its State-wide ambition) fills a most important function.

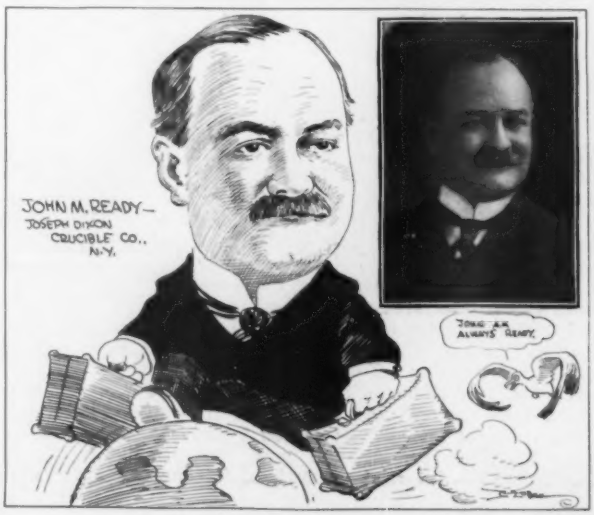
CCJ Gallery of Sales Managers








SATURN'S RINGS ARE ALL RIGHT BUT THIS ONE AROUND "LEAK-PROOF" HAS GOT 'EM ALL LICKED.
E.H. HILL
McQUAY NORRIS MFG CO.
LEAK-PROOF
SATURN



Long-Distance Furniture Moving Revolutionized by Commercial Cars

Users Agree That it Would be Impossible to Return to Former Methods. Railroads Displaced by Trucks

By E. S. FOLJAMBE

THE growth of the long distance furniture moving business by commercial cars has taken place almost entirely within the last four years. Up to that time it was not realized what a great saving in time could be effected by the use of motor-driven vehicles.

As an experiment some shipments were made between New York and Philadelphia. These were made with considerable publicity and were quickly followed up by regular shipments by the various storage movers and warehouse people in both of these cities. To-day it is not at all uncommon for goods to be carried two, three or even four hundred miles by trucks in preference to the railroads.

The conditions surrounding the furniture moving business in New York and Philadelphia are, as regards the use of trucks, quite different. Prices are much cheaper in the Quaker City both for garage and help. In New York gasoline sells for 18 to 22 cents a gallon, while in Philadelphia the price varies from 16 to 18 cents, with an occasional charge of 20. New York drivers are paid from $18 to $24 a week as against $16 to $18 in Philadelphia. Many of the drivers in the latter city work until the goods are delivered without extra wages, while in New York, time and half is always paid after 6.30, practically all the drivers being Union men working on a ten-hour schedule.

Competition Excessive

In New York particularly the competition between the various movers seems to be extremely keen at this time, and long distance hauls are made at prices which are so low that when everything is taken into consideration the profits are often found missing. This condition is said to be partly the fault of the truck makers. Owing to their eagerness to place business, they have put trucks in the hands of companies without financial backing, those who really could not afford to purchase such vehicles. In order to keep the vehicles moving there has gradually resulted price-cutting. However, among the better established firms where more careful handling of the furniture is assured and where higher priced men are employed, the prices for motor truck moving are being maintained, and these firms state that they are doing a better business than ever before. It is very noticeable that the grumbling is among the smaller companies where the trucks are less frequently inspected, and where the facilities for caring for them are not what they should be and where the drivers are incompetent.

There are a large number of storage warehouses using commercial cars in and about New York City, and all of them agree on one thing, that trucks have so increased the speed and incidentally the range of hauling that they have revolutionized the business. People expect quicker service and will deal only with such companies as can supply up-to-date methods. Although trucks may be expensive they are necessary. We find the same conditions prevail that we have so many times mentioned in other lines, namely the success or failure to make money seems to be within the hands of the driver. In the end this reverts of course to the owner, as he is the one who chooses how and by whom the trucks shall be driven. Successful furniture men are the ones who have carefully trained their drivers and insisted on systematic inspection and keeping of the equipment in the best of condition.

Storage Warehouse Building of Long Island Storage Warehouse Company

This building is devoted exclusively to storage purposes, except for the offices of the company at the corner, and has a capacity of twenty-seven thousand vanloads of furniture, in addition to which there is another building which has some sixty thousand square feet of floor space. Two enormous elevators are at the center of the building, accessible to the trucks by means of a passageway into the building from the street. Being centrally located, they minimize furniture handling within the building.

Story of the Growth of the Long Island Storage Warehouses

The writer recently had the pleasure of an interview with President Jenkins of the above mentioned storage warehouse company of Brooklyn. When asked as to his feeling in regard to the use of trucks in his business, Mr. Jenkins said: "People have no realization or conception of space any more. They expect and demand quicker service, and call up on the 'phone one day, and want to know what time you can have their goods in Hartford, New Haven, or some other town 100 miles distant the next day. Why, our trucks leave New York at 2 o'clock in the morning, with the entire furniture of a flat, and are unloading at 9.15 in Philadelphia, the run taking just 7 hours. As a rule we do not drive at night. Just the other day we had a trip to Northampton, Mass. The truck left New York at 2 o'clock Thursday P. M., put up at Stamford, Conn., and arrived at Springfield Friday at 6. Northampton was reached at 9 o'clock Saturday morning. We couldn't think of carrying on our business now without trucks. Of course we still have horses, but I shall never buy another horse. We cater only to the highest class of trade, and our prices are accordingly high, but in my whole experience with the moving of furniture by trucks we have never damaged anything, and have never had to pay for broken furniture. The kind of people that we deal with is well shown by the following incident. We moved three van loads of furniture from New York City to Madison, N. Y. The loads were put on 6 o'clock in the morning, and we left at 9 A. M. They arrived at 2 o'clock in the afternoon. Each of the vans had three helpers or nine men, and there were three packers, making twelve men in all. By 9 o'clock that same night everything was in place in the new home, rugs down, pictures on the walls, cut glass in its place in the cabinets, and nothing to do but pull down the sheets and go to bed. This customer was so pleased that he gave a tip of $5 to each of the twelve men for their efficient work."

Where Do You Get Such Men?

In answer to the above question, Mr. Jenkins said: "Our head chauffeur is the only one of our men that we got from outside. All of the others are drivers who have been with us from ten to seventeen years. This head man is an Italian trained in the Fiat works in Italy, and he is in charge of our entire equipment. He trains the men. We begin by taking a competent and likely driver, and placing him on a truck as helper. He occasionally drives to get the handling of the steering wheel, then he assists the driver at any time that any engine adjustments are made. During this time he is given instructions by our head driver, and when he turns the man over to me and says, 'this man is competent to handle a machine,' I never have to give him another thought, for I know he is competent. Our head chauffeur is paid $21 a week, and the helpers $13. They are paid

for overtime, and are not expected to work nights. They are all white men, and we make a point of having them neat in their appearance, and courteous to customers. These men are expert packers, and I do not believe that there is anyone more painstaking in their handling of furniture."

The Oldest Car

"We are operating one of the oldest electric vehicles in New York City, this being a G. V. which was put on in 1905, and is running as perfectly to-day as it ever did. We get 45 miles on a charge on an average. This truck is one used for short hauls, and we probably average not over 18 miles a day with it. Its hauls are usually from the customers' houses to our warehouses. We don't use our gas cars for short city hauls.

"The second electric was put in service in 1911, and the Universal trucks in October, 1911, and June, 1912, and the last three, which are Garfords, since July 1st.

"We care for our own trucks, having a garage 125 x 211 ft. which was built in front of our stable for trucks only. We do not store any gasoline, but buy on the street, now having a contract at 17 cents, but we have been paying 19. During last month we used in the neighborhood of 650 gallons which filled the tanks in the morning before trips, and about 400 gallons which were bought on the road, the drivers turning in receipts for all gasoline bought.

"For some unknown reason, if you put a horse van and a motor driven van side by side, it takes the drivers half again as long to load the motor van as it does the horse vehicle, so for very short hauls they don't do any more work. Our gas machines are used only on the long hauls. We now have in all seven motor driven vehicles, the oldest gas truck being a Universal which was put in service October 12, 1911, and has now covered for us 59,000 miles. The engine is running as quietly to-day as any touring car motor, in other words we keep our equipment always up to the highest point of efficiency."

When asked regarding depreciation, he said: "We figure ten per cent., owing to the fact that we do keep the equipment up, and if I had a man who was driving so that this wouldn't work out, I would fire him in a minute. The engines are practically foolproof. It has been my experience that drivers either forget to give the engines the same care that they would a horse, that is they forget to give it food and water at regular intervals, or if we have any trouble, they are everlastingly tinkering with it, and get it out of adjustment. If they let things alone, and simply give the machine ordinary care and attention, it will do the business."

Removable Bodies

Mr. Jenkins has worked out a system of removable bodies for furniture which is to be transported by rail or to Europe. These bodies, as shown in the acompanying illustration, fit the truck chassis, are lined on the outside with sheet steel making them fireproof, and have heavy iron bands which radiate from a ring at the top, and are bolted to the sides. By means of these two rings the entire body can be swung abroad a flat car or into a vessel, or on to a loading platform. The goods are packed very securely, their weight being distributed so that it is unusual for these bodies to hang more than a few degrees from the horizontal when swung from a crane. As the goods are packed, they are securely lashed in sections to rings on the inside of the body so that they cannot possibly shift. In this way the goods are shipped to Europe, the Long Island Storage Warehouses having representatives in Berlin, Paris, Bremen, and most of the important foreign cities. Where a large shipment is made or the goods are especially valuable, the same man that packs them is sent to London, or wherever the goods are to be delivered, and they are not touched until they arrive in front of the house, and this same man again unpacks them. This method saves many handlings, and particular customers are willing to pay for this service. Often the goods after being packed in the van body are left in storage for several months before going to their destination, but the goods do not have to be handled. The van body is jacked from the floor, placed on a special four-castered truck, and four men can handle a body weighing 2900 lbs. containing close to 5 tons. The bodies when they arrive at their destination by freight car are lifted and placed on low stone wagons, and are carried in this way to the unloading point.

Detachable Bodies for Furniture
Can be Shipped to any part of World
by Motor Van Railroad or Steamship
LONG ISLAND STORAGE WAREHOUSES
BROOKLYN, NEW YORK CITY

Detachable Body Being Swung Aboard a Flat Car, Two of These Forming a Carload

Household effects are thus shipped to all parts of the United States east of the Mississippi, and to any of the large cities of Europe.

The First Universal Truck of the Long Island Storage Warehouse Company

This truck has done fifty-nine thousand miles and is in first-class condition and good for several years to come.

Cost of Operating These Trucks

Mr. Jenkins said in regard to the comparative cost of trucks and horses, that it was very difficult to make any statement, about the only way to get at it being to figure during an entire year the cost of doing business and the receipts for same. The large gas cars cost me about $17 a day, including the driver and two helpers, and about $12 a day for an electric, and $9 for a horse van. The gas car has 680 cu. ft. capacity, the electric 560, and the horse van 460. This of course does not take into consideration the fact of greater speed and the new business which has been created due to long distance work. Costs have to be averaged over a year, our business being by seasons, beginning about the 15th of March. It is especially good about Labor Day, up to the 15th of December, and slack until March again, but we carry all of our men right through.

Loading a Demountable Body

This body is being packed for a long-distance shipment, the goods within being securely lashed in sections as they are placed within the body, so that no movement can occur. Pianos are usually placed at the center, under the point from which the body is lifted by cranes or derricks.

Chelsea Company's Packard
This company is now employing seven trucks and has never had any breakdowns

The Fireproof Storage Warehouses were started in 1887, and Mr. Jenkins may be considered the grandfather of the business in Brooklyn. About half of the horses have been disposed of since trucks were put in service, there now being sixteen horses, and nine wagons in use. "Our business," he said, "is better this year than it has ever been before. From the 15th of September to the 18th of October we handled from sixty to eighty loads of furniture a day."

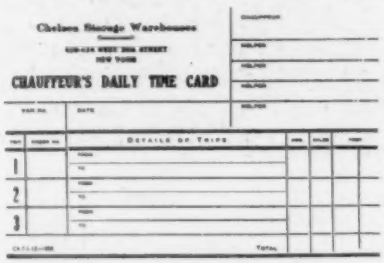
The remarkable success of this company with trucks, is undoubtedly due to the unusual care with which the trucks are handled by the drivers, and the fact that the equipment is not allowed to deteriorate.

The Chesea Storage Warehouses

Another successful New York user is the Chelsea Storage Warehouses. This company is now operating five three-ton Packards, one one-ton Federal, and one two-ton Mais. President Schramm is most enthusiastic over the work which it is possible to do with these vehicles, and says: "Four years ago we put on the first Packard truck, and in ten months it had paid for itself. Of course conditions were more favorable then than they are now, as not so many were using trucks in long distance hauling. We ran one car eighteen months without any expense whatever except tires. The machine did not require an overhauling during this time. Another machine operated for fifteen months; business increased and instead of having less horses we put on more to take care of the local hauling. We increased from twenty to twenty-five horses, and gradually increased the number of trucks until we now have seven. We pay our drivers $18 a week, helpers $15, and overtime after the ten-hour day." He also said: "I would not do without them; I couldn't, they are a necessity in this business. I find that our horses are in very much better condition, as they are saved all the long, hard, hauls. There is a team," pointing to a pair of fine black horses at the curb, "that I paid $700 for. After a year's time they are just as good, if not better, than when I got them. Before we had trucks they would have been run down, and in another year or so practically no good. I used to go to the stable, and hunt to pick out horses that didn't have sore necks, when we had a hard pull to make. Now, all the horses are in the finest of condition, as the trucks do all the tough jobs. People expect trucks, and a company that doesn't have them won't get the business. Although the prices have been cut into somewhat, I believe, owing to the manufacturers placing trucks in the hands of firms who had no business to own machines and no financial standing, still the long distance hauling will take care of itself, and I think the prices will be higher rather than lower very soon."

Pay Well if Kept Busy

"If I could keep these trucks going 6 days a week on an average of 50 miles a day, they would do it at 40 cents a mile, counting in all expenses, driver, etc., but I can only keep them busy about 4 days a week, and it costs about 50 cents a mile, or in the neighborhood of $15 a day for a three-ton truck, not counting the wages of the two helpers. We pay 21 cents for gas, and garaging at $25 a month. The two drivers who were on our first trucks get $25 a week. All of our drivers have been with us driving horses for years. They are careful, responsible men, and collect from $100 to $300 quite often, and we have never lost any money by them. They make out a chauffeur's record card, which is turned in each night. This shows where they started from, and where they went,


Chelsea Storage Warehouses
CHAUFFEUR'S DAILY TIME CARD
DATE
Details of Trips
1
2
3
Total

Chauffeur's Daily Time Card
The above form is used by the Chelsea Storage Warehouse, the drivers making their reports on this each night.

hours on the road, miles travelled, who was the driver, and who were the helpers. If helpers are sent back after the load has been handled, a record of this is made. On the reverse side of the card are the expenses, gasoline, oil, repairs, ferrage, telephone, etc., and remarks of condition of roads, or accidents, and anything unusual which may have happened."

When asked what they did when they got stuck, he said: "We never get stuck, we have never had to tow in a machine yet. If the machine isn't in first-class condition we don't go any distance with it, but stick close around the city. We carry extra wheels one on the front, and one on the rear, which can be quickly put on to replace any damaged wheels. We are very well satisfied with trucks, and would not think of trying to get along without them."

Long Acre Express and Storage Company

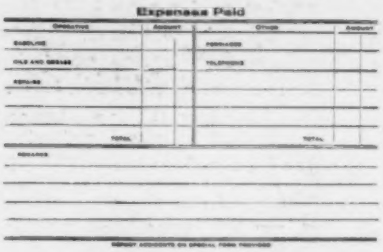
This firm is now using three Gramm trucks of 1, 2 and 3 tons' capacity, respectively. One of these was put in service two years ago, and the others in March and April of last year. They do all kinds of hauling, both long and short distance, the firm using also thirteen horses. They have had the same experience as the Chelsea people, that the horses are now in very much better condition since the trucks were put to work. They recently took six loads to Philadelphia from Madison Avenue, New York. "Whenever there is a rush, we can handle it with the trucks." The machines are overhauled about once a year, but no records are kept of what the machines cost to operate. There seems to be a feeling of "what's the use of keeping records? We take in what comes and pay the bills, and if there's anything left, its profit."

Lincoln Express and Van Company

This company operates one three and a half ton Alco truck, which was put in service a year ago in April. It is used particularly for long hauls, but is also used around the city if it would otherwise be standing idle. The statement was made that although the truck was expensive to operate, yet they had to have it as their regular customers whenever they moved out of the city, expected them to take care of the moving, and in order to do it the truck is necessary. This holds the customers' trade. "We figure on the cost of a job acording to the mileage, as that is what makes the truck depreciate. If we have to go 40 miles, we charge more than if we have to do 30. On the round trip this really makes 20 miles difference, and the last 5 or 10 miles may be very bad roads, or conditions may be such as to make the wear and tear on the vehicle very much greater. It costs us about $13 a day to operate, including $25 a month garaging, $22 a week for the driver, and 50 cents per hour overtime, if they work after 6.30. It costs about as much to keep the machine as six horses, but it will do more than six horses' work in long hauls, but not in the city. While standing idle all the fixed charges go along just the same. Insurance alone costs us about $1 a day, and I wouldn't put a truck on the streets without it. We go to Greenwich and Stamford, Conn., trips which we used to try to make with six and eight horses. With the trucks we can make these trips in a day and think nothing of it. The horses used to be done up, and no good for the next day.

Time Lost at Elevator Apartments

"We are trying to have a charge made by the hour as so much time is lost, people not being ready when they say, and we have to wait. At elevator apartments we often have to stand an hour or two hours waiting for someone else to get through with the elevator. The goods have to be placed on a small elevator at the front, lowered to the basement, carried the length of the basement and then put on an elevator at the rear, all of which handling loses


Expenses Paid
Operation
Amount
Other
Amount
Gasoline
Oils and Grease
Repairs
Total
Total
Remarks

Reverse Side of Card
On this side of the card is kept a record of the cost of the trip, together with any special remarks on accidents, etc.

a great deal of time. It seems that the cost of about everything has gone up except the charge for moving, but in spite of this we have to have the truck to care for the business, and meet competition."

The Pioneer Truckman

In New York City, Henry Adams, 212 W. 43rd Street, is probably the pioneer, having been in this business at this location for 47 years. He purchased a three-ton Packard in the Fall of 1911, and disposed of ten of his sixteen horses. With this machine he takes care of all the long, hard pulls and thus relieves his horses. He particularly mentioned the Packard service, how well he was cared for. In one instance at 177th Street the truck was struck by a runaway horse, damaging the radiator. The Packard Service Station at Long Island was called up. The superintendent of the Adams Company was at his home at the time, but when he reached his office he was informed by 'phone that the truck was already on its way, a new radiator having been put in place.

"Yes, we have to have a truck," he said, "we go to Philadelphia quite often, and on long hauls it saves our horses. We used to start at 12 o'clock at night to drive to Bernardsville, 50 miles. After about 14 hours of driving both the horses and drivers were all in, and no good the next day. With the truck we start out at 8 o'clock in the morning, and get back at 5 the same night. Yes, we have to have a truck to meet competition and accommodate users. A truck is all right, if you have business enough for it."

Dochterman One of the Largest Truck Users

The Dochtermann Van & Express Company, of East 10th Street, is one of the largest truck users in the storage and moving business in New York City. They occupy a fine fireproof building of Dutch architecture, with a complete garage at the rear, containing a most up-to-date machine shop, in fact a truck can be entirely rebuilt. The garage is also capable of garaging thirty outside cars. There is also a blacksmith shop, where the horse shoes and any forging jobs are cared for.

Rapid Loading by Means of Removable Bodies on Rollers

Rapid loading of the three Packard trucks operated by the Hartman Furniture and Carpet Company, of Chicago, is facilitated by the use of large removable bodies mounted on rollers. The landing platform is the exact height of the truck chassis, making the transfer of bodies an easy task. While one set of bodies is in use another set is loaded. Thus the truck is always in action, with the exception of the short time required for the transfer.

The fleet now consists of ten three-ton Packards, this firm having experimented with motor driven vehicles as early as 1907. The first of the Packard fleet was put in service in 1910. This company is one of the few Packard users that does not depend on Packard service. The Dochtermann brothers do all their own repairing in their own shop, and claim that they can get on the job after an accident quicker than they could get the manufacturer. A complete line of extra parts is carried, including axles, wheels, etc.

Most of their drivers are their own men who have been with them for years in the service, and these men have been trained very carefully to handle trucks. Here again is seen the reason for the success of this company with motor vehicles. The drivers know their business. On the small rigs they get $18, and on the large machines from $20 to $24 a week. "Our drivers are careful and intelligent operators," said one of the brothers. "For example, one man was halfway between here and Philadelphia when something happened in the gearbox, and he couldn't use any but the high speed. Instead of stopping, he operated the truck on the high gear, even starting the load on same, and carried the goods to their destination. He telephoned us from Philadelphia, and finally drove back all the way to New York the same way, being careful to engage the clutch gradually in starting. Many drivers would have given up, and had to be towed in."

The drivers are also expert in packing and handling furniture, and collect whenever necessary. As a rule, they are not Union men, but they only work on an average of 10 hours a day. If they are late getting back, they usually have some time off the next day.

This firm formerly had sixty-five horses and thirty wagons. Business has grown tremendously, but with the trucks thirty horses are all that are required, and again the fact that the horses were in so much better condition since the trucks were put in service, was mentioned. "The horses don't know what it is to make a big trip now," said Mr. Dochtermann.

When asked where they went with trucks, he said, "We go anywhere where people will pay for the service, to Poughkeepsie, N. Y., Philadelphia, or anywhere else. Our loads don't average over three tons as a rule, unless barrels of crockery, or stoves, etc., are carried."

The vans do work which was formerly taken care of by railroads, the only difference being that people can now move to points one hundred miles or so distant, without being homeless for three or four days and have to put up at hotels.

A Record Move

Not long ago we made a record for ourselves in quick moving. The offices of a business firm had to be transferred to Philadelphia. The offices in New York did not close until 5 o'clock in the evening. Our men were immediately on the job, the trucks loaded with the expensive office fixtures, furniture, show cases, things which would have taken a long time to crate. These were packed securely in the padded bodies, and at 8.30 the next morning in Philadelphia, the office employees came in and everything was in place. We had a force of carpenters who set up the office fixtures, and everything was in shape for business in the morning. Such a thing of course would have been utterly impossible before the use of trucks.

People who have fine furniture, statuary, etc., don't want to take chances on the railroad, and these are the people who ship by trucks.

The Dochtermann building has a frontage of 160 ft., and is nine stories high. The garage is 80 x 80, and entered from the rear at 11th Street.

In regard to the cost, the Dochtermann Brothers figure $15 a day for a three-ton truck, and say that they could no more do business without them than they could without telephones.

It has been the writer's experience that where a proper sized truck has been employed, with knowledge and understanding, in work for which it is suited, it has always paid the user. Whenever I hear a tale of woe such as follows I imediately make up my mind that somebody, either the driver or the owner, is abusing the vehicle or is not using it on work to which it is suited, or that it is the wrong sized unit for the class of service in which it has been placed.

The career of a truck in the furniture moving business is probably as strenuous as any. No class of users realize more fully the fact that the truck must be kept moving in order to pay a dividend. This is exemplified by the three-ton Peerless truck of M. Sweeney & Company, of Fall River, Mass., which is a fair example. In the daytime it does general trucking and moves household goods. On Sundays in the summer, passenger seats are fitted and it takes excursionists to the ocean beaches. In the strawberry season it has regularly carried two truck loads of strawberries every night from Fall River to Providence.

The dense population of that part of Massachusetts, where many cities of con-

The Paine Furniture Company, of Boston, Using Packard Trucks

These trucks cover a range of territory taking in Providence, forty-five miles distant; Worcester, forty-five; Fall River, sixty-five; and Holyoke, one hundred and seven. Under the old system, these towns were reached only by freight and express. A feature of the open bodies used is the loose tarpaulin tops, which are carried under the seat and taken out in rainy weather. It takes about one minute to cover the entire load with tarpaulin.

siderable size are not far from Fall River has caused it to be used often for transporting interurban freight, and so largely increased the mileage it has piled up.

Leaving Fall River at 6 o'clock in the morning the truck has taken a heavy load to Lynn and after covering 120 miles reached home at 7 o'clock in the evening. It has done as much as 200 miles in 24 hours.

It is fitted with a special convertible body. The sides and top are removable and the top can be adjusted to allow for variable heights. This is a convenience when a piece of furniture is taller than the standard body. It is unnecessary to take bureau's and such things apart in moving them.

Waite's GMC Fleet Displaces Horses at Thirty-five Per Cent Saving

This company located at Park and Tremont Avenues, New York City, makes a specialty of long distance moving. When asked for his experience with trucks, Mr.

Knox Model R-16 Four-Ton Truck Used for Long-Distance Work

This truck frequently makes trips to Boston and New York, and to a large number of surrounding cities and towns within a sixty-mile radius from Springfield, Mass. The owners estimate that the motor truck is so serviceable with this class of work that its up-keep cost is negligible.

W. A. Waite, president of the company, made the following statement: "In March, 1911, we bought a second-hand G. M. C. truck, and after using same rather severely we decided in June to buy a new truck of the same make. Our experiences with trucks were so satisfactory that we sent in a repeat order in January, 1912, and again April 5, 1912, and on August 5, 1912, and still another machine was put in service September 15, 1912. They have proved a real success, and we are so well pleased with them that we have ordered another to be ready in time for the 1913 Show at Madison Square Garden. This we will put in service immediately after the Show closes." These trucks have been put to the most severe tests, making very many long hauls, far from good roads much of the time.

Business Increased Fifty Per Cent Due to the Use of Trucks

The trucks have stood up wonderfully well, and as a direct result from their use our business of hauling for the year 1912 shows an increase of more than 50 per cent. over the year 1911.

This increase we attribute solely to the use of Motor Vans, for by their use we do work that we could not attempt to do with horses. Five motor vans are doing more than double the amount of work that was done in 1910 by twenty horses at a saving of 35 per cent. expense; we simply could not do without commercial cars.

J. B. Peckham Making Long Hauls in California

Long distance moving by commercial cars is very rapidly increasing. From all parts of the country we hear of the unusually good work being done in long distance moving. By this we mean runs of from 1 to 300 miles, taking the place of railroad shipments.

An enthusiastic long distance hauler is J. B. Peckham, of San Mateo, Cal., who uses a Kissel Kar truck. In speaking of this long haul work, he cites an example of a recent trip made from San Mateo to Los Gatos.

"In former times, we used to leave for Los Gatos at 6 A. M. with four horses, and before arriving would need the help of two more to negotiate some of the grades. Arriving late that night we would unload and stable the horses, our man putting up at a hotel.

"Next morning we would leave very early for San Mateo, arriving late in the evening of the second day. The horses would then have to be turned out and 'rested up' for two days, so in reality it took four horses four days to make the trip, to say nothing of the two extra horses for the hills.

"We had occasion recently to make this trip with our three and a half-ton Kissel Kar truck, loaded to capacity with furniture. We did not leave San Mateo until 8 A. M., made the trip, unloaded and were back in Mateo at 4.30 o'clock of the same day.

"In this particular case the motor truck showed four times the efficiency of the team by doing work in one day, whereas four days elapsed before the horses were again ready for the road. Besides we saved the stabling expense and the driver's hotel bill.

"Since we have had the truck it has not had an idle day and we have received calls from people in localities where we had never worked before. We cannot speak too highly of the motor truck for such a business as ours."

A Remarkable Long-Distance Trip

A mud-plowing experience, to say nothing of bucking snowdrifts over 18 in. to 3 ft. in depth, has won to the ranks of believers in commercial car supremacy the William Lee Company, of Troy, N. Y. The very first trip made by the three-ton Kissel Kar of this company was to Troy from Pittsfield, Mass.

It was undertaken with many misgivings as the route to be traversed extended over the Lebanon mountains, and included one steady four-mile hill climb with grades ranging from 8 to 15 per cent. besides many other hills. The entire distance from Pittsfield to Troy is forty miles.

The difficulties encountered en route, and an appreciation of the remarkable performance which this commercial car carried through successfully, can be had by reading the following extracts from a letter written to the truck makers after the return. They speak of the feat as follows:

Brown Internal-Gear Truck Used by Otto Aicher

Note the large load, yet this work is successfully done on pneumatic tires

"Shoveling frequently became necessary, and in one section the four men shoveled for 3 hours. But the truck plowed its way through places where the wheel tops were actually covered due to its 50 h. p. motor and the differential lock. It was an all night demonstration of overcoming obstacles that were seemingly impossible, and the load was delivered without serious mishap, although there was a narrow escape at one time, when in turning out to pass a vehicle in a narrow stretch of road, the rear wheels skidded in soft mud over an embankment into the ditch so that one front wheel was raised 18 in. from the ground, and the rear axle imbedded in mud.

The truck seemed hopelessly mired, but after carrying a quantity of cobble stones and fence rails a solid foundation was formed upon which the lower rear wheel side was jacked up. The engine started with locking device set and the powerful motor brought the truck, with its overload, back to the road bed again.

The driver, Earl Coons, who has had a long truck experience, declares the work of the truck to be the most efficient he has known, and that no truck without a differential locking device could have possibly surmounted the unusual difficulties encountered on this trip."

Economical Long-Distance Moving

Jarboe Brothers, of Baltimore, have also had experience in long distance moving with their two-ton truck, having made what they consider a remarkable one hundred and fifty-mile round trip between Baltimore and Hagerstown, Md., the truck being loaded with furniture one way. On this run the vehicle averaged 6 miles to the gallon, which is considered especially good in view of the fact that the route was over very difficult sandy and mountainous roads.

In daily service this commercial car is doing the work of two four-horse teams, and is doing it more satisfactorily.

Runs of over 200 miles are becoming more frequent. Recently Hersum & Company, of Boston, carried on their two one-ton Kelly trucks capacity loads of furniture from Boston to New York, a distance of 242 miles by road, in 22 hours, and 50 minutes, returning empty in 19 hours, making the average speed on the outward run of 10.6 m. p. h., and on the return 12.7 m. p. h.

The economy of gasoline and lubricating oil was very noticeable; 90 gallons of gasoline were used by both trucks, the

Two Speedwell Trucks in Use by Cappel Furniture Company, of Dayton, Ohio
This firm uses ten motor-driven vehicles, which are doing very satisfactory work. The two trucks shown above have not been laid up a single day through failure of the truck

vehicles averaging 10.8 miles per gallon, and the remarkable showing of 96.8 miles per quart of lubricating oil was made.

Hersum & Company have made several long distance runs with these Kelly trucks. On one occasion they sent a load of furniture 270 miles in 31 hours.

This truck left Boston at 9 A. M., Monday, April 14th, and drove 130 miles to Hartford, Conn. Arriving in Hartford it carried two loads from one point to another, and then taking on a full load of furniture, returned to Boston. The Kelly arrived in Boston at 4 P. M. on Tuesday.

Later in the week this same Kelly truck made a run of 89 miles on 7 measured gallons of gasoline, and 1 pint of lubricating oil.

A three-ton Kelly, owned by the same company, recently made a record breaking run from Boston to Fall River and return. The truck left Boston at 2 A. M., went to Fall River, and took on a load of furniture, and returned to Cambridge at 5 P. M. on the same day. The total distance was 104 miles over heavy roads. On this trip 18 gallons of gasoline were used.

Some Difficult Moving

The same company received one morning a hurry call to move a load of household goods from Arlington, Mass., to a summer home at Plymouth, Mass., 48 miles distant. The truck left Cambridge at 1 P. M., drove to Arlington 3 miles away, and took on its load. Delivered it the same afternoon at Plymouth, and returned to Cambridge at 10.25 P. M.

The total distance covered was 93 miles, time 9 hours, 45 minutes, including time spent in loading and unloading. Nine gallons of gasoline and 1 quart of oil were used.

Trucks Show to Advantage in Winter

Another very enthusiastic truck user is A. E. Holmes, superintendent of delivery of Alexander H. Revell & Company, of Chicago. This company operates a large fleet, among which are five three-ton Kissel Kars. These vehicles have replaced fifty horses, and careful records show a large saving in favor of trucks. In speaking of the work of these trucks Mr. Holmes although pleased with the comparative cost figures, looks beyond these as shown in the following statement made by him:

"In our business we must be up-to-date. Our customers demand the best we can give them in service. Even if motor trucks were more expensive—which they are not—we would never go back to horses."

On February 21st of last year Chicago suffered from an unusually severe blizzard. The trucks of Revell & Company were kept busy; Mr. Holmes says: "We thought at that time that the performance was a remarkable one for trucks under such con-

Waite's GMC Fleet
This company makes a specialty of long-distance hauling and saves thirty-five per cent with trucks

G. V. Electrics of Duff & Repp Furniture Company
This firm is a consistent user of trucks over the hilly streets of Kansas City

ditions, but they were put to an even more severe test on February 26th, during an extremely heavy snowfall. We made all our deliveries without any trouble whatever, and found that we had plenty of power to go through any snowdrifts that we had that winter, and the snowfall was unusually heavy."

He also mentioned the fact that even among the skeptics the trucks have earned the reputation of being able to go out, deliver the goods and come back without being stalled regardless of weather and says in closing, "Thus far they have exceeded our expectations in the way of performance."

Furniture Handled by Express Trucks

If any class of users prove conclusively the economy of motor driven vehicles, it is the expressmen. They make their living by hauling and transporting goods economically, and it is a known fact that every year there is a tremendous increase in the number of trucks used by expressmen. They certainly are not disposing of horses and using trucks for the fun of it. "There is a reason."

The Schlesinger's Express, of Chicago, is a fair example of a progressive company using commercial motor cars. This company reports a record of 40,000 miles for a three-ton Kissel without its ever having been out of commission. The repair bill for six months of the present year was $2.70. Minor repairs and adjustments were all that had been necessary. As an example of the routine work which this vehicle is accomplishing, may be mentioned a one hundred-mile trip with household furniture. The truck received a load of 5500 lbs. at 1549 Northwestern Avenue, Chicago, on Sunday morning, and delivered it at 35th and Vliet Streets, Milwaukee, and returned to the garage, the actual round trip running time being 36 hours. Thus for nearly 100 miles over roads notoriously rough at the best, and considered almost impassable in winter, the commercial car showed that it is not a mere competitor or successor to the horse, but a new element in transportation. While Brooks, the driver, admits that the trip is not one that he would care to take regularly during the winter, he is proud of the fact, however, that he went through it without a mechanical mishap and no damage to the goods carried. He was snow-bound several times and had to dig his way out with a shovel. Also on several occasions he found it necessary to use the differential lock, a device which distributes traction to both or either of the rear wheels when one becomes stuck in a rut or otherwise ineffectual. It would seem that the trip must have been taken to test the endurance qualities of the truck, but it is asserted that it was undertaken as a measure of economy and, as a matter of

Two One-Ton Kelly's Used by Hersum & Company, Cambridge, Mass.
The trucks are en route Boston to New York, with furniture. Run made in twenty-two hours and fifty minutes; return, empty, nineteen hours

Three-Ton Peerless Truck of the M. Sweeney Company, Fall River, Mass., Which Has Been Giving Successful Service in Furniture Hauling
White Truck in Use by the Hub Furniture Company, of Fort Worth, Tex. Note the High Stake Body Used
GMC Used by the Ott-the Square Storage and Transfer Company. Another Enormous Closed Body With Rear Doors in Separate Parts
Two of the Seventeen GMC Electric Trucks Used by Carson, Pirie, Scott and Company, of Chicago. Both Fitted With Screen Bodies
A Three-Ton Kissel Kar Used by Schlesinger's Express Company, Chicago, for Moving Furniture, Pianos, etc., in and About Chicago and Suburbs
GALLAGHER'S FURNITURE TRANSFER
GMC Electric in Service of Gallagher's Furniture Transfer Company, New Orleans, La. With Large Closed Body

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fact, saved the owner of the furniture from $40 to $50. Had the goods been shipped in the usual way, the owner figures that he would have had to meet the expense of the following: Crating, loading and hauling the goods to the railroad terminal, freight charges from Chicago to Milwaukee, unloading and hauling in Milwaukee and uncrating at destination. In using the truck the goods were handled but once in loading and once in unloading, and did not require expert packing in material or men.

Otto Aicher, a furniture dealer in Michigan City, Ind., makes the statement in regard to his Brown internal gear-driven truck: "We find it far better than the horses, as it does the work of about four horses in a city of this size, such as getting freight and making long trips and other deliveries. As for the expense of keeping the machine, it does not cost any more than keeping one horse.

"We have not had this very long, but so far we have found it very fine and think we have just the right thing, as it is certainly of advantage in tnis line of business, and we are very much pleased."

In hilly Kansas City, Mo., the Duff & Repp Furniture Company is proving the worth of electric vehicles, operating four two-ton G. V. Electrics which were purchased in February 1910, July 1910, June 1912, and April 1913. Although the service is rather strenuous owing to the extreme hills the trucks are making a good showing and the company expresses itself as well pleased with the work which they are doing.

Another furniture company using electrics is the Grand Rapids Refrigerator Company, of Grand Rapids, Mich. This company uses a Couple Gear truck of 3 tons' capacity. It is fitted with seventy-six cells of A-8 Edison batteries. Already it has been in service 5 years, and according to statements made by the company is good for 5 years more. Its mileage is about 35 a day, and the owners figure that it is doing business for them for much less money than they could do it with horses.

The Bissell Carpet Sweeper Company, of Grand Rapids, use a gas-electric truck of the same make. This truck has been in constant service for the past 3 years, and always seems to be on duty. The owners say that it answers their requirements, and is very satisfactory although they have never kept any cost records, and don't know how the expense compares with horses.

Carson, Pirie, Scott & Company, of Chicago, are now operating seventeen G. M. C. electrics, and eleven G. M. C. gasoline trucks in their large fleet. In March, 1910, they installed two three-ton trucks of gasoline type for their warehouse service, these vehicles having been in active commission ever since. Of the electrics ten are of 1000 lbs. capacity, while the others are of larger size, one being at least of 4 tons' capacity. The company expresses itself as being well satisfied and the fact that from time to time more vehicles are ordered is sufficient proof that these men believe that commercial cars pay in delivering furniture.

It is the experience of many truck users that their purchasers appreciate the superiority, reliability, and speed of motor de-

Republic Used by Syracuse Firm
This truck is doing splendid work for the William Herman Company, a well-known Syracuse furniture house.

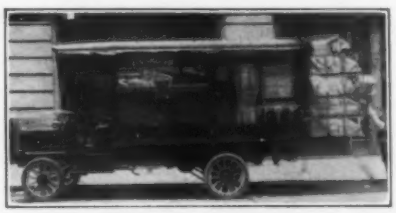
livery, and therefore prefer to make their purchases from merchants employing such methods. This at least has been the experience of George M. Winslow, a piano dealer of Waukesha, Wis. He uses a 1500-pound Kissel, and consistently advertises the fact in his publicity in the local newspapers, believing that this is a distinct asset to his business.

Four-Wheel Drive Couple-Gear Electric
This car is in use winter and summer by the Grand Rapids Refrigerator Company, Grand Rapids, Mich. Note the complete protection of the driver on truck without cab.

In Dayton, O., the Cappel Furniture Company is using ten trucks in delivery service. In speaking of two of these trucks, which are of Speedwell manufacture, they say: "These trucks have not been laid up a single day nor have we had to make a replacement of any part, either by wearing out or breakage. We are thoroughly pleased with the work which our trucks are doing in furniture delivery, and we sometimes have exceedingly heavy loads, as we also carry stoves."

A Dissatified User and No Wonder

Recently I called upon a man who was using a truck for furniture moving, and



Truck Displaces a Warehouse
When the Sperry & Hutchinson Company, of New York, bought a Packard truck, it discontinued using its Brooklyn warehouse. This meant a net saving of $5774 annually. Large enclosed bodies with wire-netting sides are used. The sides are equipped with storm tarpaulins.

inter-city hauling, suburban work, etc. Of all the dissatisfied users, he was the most dissatisfied. "I can't tell you anything that'll do you any good. You don't want my story." "What's the matter?" said I. "Oh, everything, the cost is too much, it is always expense! expense! expense! We don't have work enough to keep it going, and it stands idle in the garage, and when we do have a big job that we could make some money on, it's laid up."

"Have you had mechanical troubles, or what are your difficulties?" "Oh, everything, tire troubles, engine troubles and everything else. Why, the machine cost us during the month of April, $600, $200 of this was prepaid insurance." "Insurance?" "Yes, the insurance has paid us. We have had two lawsuits within the last two months." "How did that happen?" "Oh, the driver killed a horse, smashed up a truck by backing into it, and jammed up an automobile. If it hadn't been for our liability insurance we'd have had to pay. The driver reported in the last case that he didn't even see the automobile, and didn't know that he hit it."

"Tires are always giving out."

"Don't you have guaranteed mileage on tires?"

"Oh, yes, but it holds the machine up anywhere from half a day to a couple of weeks every time they have to be changed."

"You don't have any spare tires or wheels?" "No, it costs too much now without buying extra parts.

"In June it cost us $300, in fact for the last five months from April 1 to September 1st, it has cost us including the drivers' wages of $18 a week, $1458.49, and it hasn't been working more than half the time. Why, just the other day we sent the truck to Atlantic City, we filled the tanks before starting, and she carries 22 gallons of gasoline, and when the driver returned he brought in a bill of over $11. Four dollars and seventy cents paid for gasoline on the road and $3 for extra oil."

The writer had expected something of this kind, and the case of this user is not, I am sorry to say, so very different from many others who have not studied motor transportation, who have never taken the trouble to know the conditions before purchasing, and who, even though they are losing money at the present time do not seem inclined to spend a small amount in prevention, and save considerable in the end. This very machine was followed by the writer in a touring car, and the three-ton truck with a full load, with a dense cloud of smoke trailing behind, was doing fully 25 miles an hour.

Hasn't it a governor? you might ask. Certainly it has, or rather had, but the governor like the speedometer and other parts are out of business, and the truck at the highest speed possible was being driven over all kinds of roads, car tracks, railroad crossings and ditches. No wonder repairs are needed.

Looking at the engine I noticed at least a half a dozen cap screws and nuts missing, with the oil and dirt working out all over the mechanism. The sides of the hood had been removed, the brakebands were hanging in ribbons, the machine was covered with mud, and its entire appearance showed neglect and careless handling.

While talking with the owners I noticed what was left of the speedometer under the safe, evidently thrown on the floor and kicked under in disgust.

The condition of that truck was a shame, and the state of mind into which the owners had been worked by the breakdowns and expense was worse.

This again is the case of a user with a big investment on his hands, in fact too big, for in the first place as he acknowledged, he did not have work enough to keep the truck busy. A ton and a half or a two-ton vehicle would have been better suited for the work in hand. A case of ignorance on the part of both owner and operator,—no governor, no speedometer, no recording instrument of any kind to keep tabs on an evidently reckless driver. When it was suggested that the vehicle should never be run over 12 to 14 miles an hour, the owner's shrugged their shoulders, and said, "how are you going to prevent it? They coast down hill as fast as the truck will go, and that is pretty fast." They admitted that the driver had no interest in the truck's condition or in keeping the vehicle running, and yet they would not listen to a suggestion that they fire the driver and get a good one or that a few dollars bonus be paid him over and above his wages if he kept the expenses on the vehicle below a certain figure for each period of three months. They weren't going to pay any more, it was costing enough already, blindly overlooking the fact that $5 as a bonus insuring the driver's interest in the care of the truck would undoubtedly save them anywhere from $50 to $100 a month of needless expense. Recording instruments were scouted as being no good as they wouldn't stay in running condition any length of time. It was then pointed out that under such circumstances they could get instruments put on which they could rent, without having to take the responsibility of their condition.

Their attitude was one of utter disgust with the whole proposition, yet with no great eagerness to take steps to prevent the useless expenditures which they were making.

It is but justice to the truck to say that the same make of vehicle in the same class of service, in the same city, is making money for its owners in several instances known to the writer, and this company like many others, is a glaring example of ignorance on the part of the owner as to how a truck should be operated, aggravated by the carelessness and indifference of the driver.

Intensified Trucking

Compare this record with that of another company using the same kind of trucks in the same line of business in the same city. I refer to the Milbourne Storage Company. On March 11, 1912, seventeen months ago this company purchased a three-ton Mack truck. At this time the firm was using some eighteen horses in moving and storage. Mr. Melville, in speaking of the matter, said, "I thought that my horses would now get fat, and that the one truck would do all my country hauling, but I soon found that the work increased with our capacity for doing it, and that the horses were worked about as hard as ever, so on the 7th of October of the same year I bought another three-ton Mack, but the business still increased, and although I was working the trucks day and night we still retained the horses for short hauls and all kinds of odd jobs. Again on January 28, 1913, we purchased the third of our trucks, but still we have horses, but of course the bulk of our work is done by the machines.

These trucks although driven continuously are carefully inspected whenever they turn up at the garage, which is seldom enough for they are often gone 4 and 5 days and nights at a time, the crew carrying folding cots with them, and sleeping either in the body or under the machine at night. On long trips of this kind

Method of Attaching Trailer

This is how the Milbourne Storage Company attaches its trailer. The tongue on the trailer is hooked on to the rear of the truck, fastened with a chain and then roped securely.

where there is continuous driving during the night, two drivers are usually sent when specially heavy furniture or pianos are to be moved, three men in addition to the drivers make up the crew.

Mr. Melville says, "To get anything out of a truck you must keep it moving day and night." This he literally does, as the following run which is quite typical of what the company is doing, will show. An order was booked to move a family from Easton, Pa., to New Haven, Conn. The truck started that same night from Philadelphia, drove all night, arriving in Easton after a six-hour run at 7 A. M., the distance being in the neighborhood of 65 miles. Here the load was taken on, and of course no crating was required. The machine started out as soon as loaded, drove the 70 miles to New York City, and continued straight on through the night, driving the 80 or 90 miles of road from New York City to New Haven, Conn., arriving in the morning, unloaded, and immediately returned to New York City, which point was reached about six o'clock in the evening, in fact in time for the truck to be again loaded from a storage house with furniture, for a family moving from New York City to Philadelphia. Just as soon as the load was safely stowed, although it was dark the truck started on its long run, and after driving all night, reached Philadelphia the middle of the next forenoon, making in all a four-day trip, for which the company received $320. The people who were moved were well satisfied, as it cost them much less than crating and shipping the furniture, and also because there were no delays, as when shipments are made by railroad.

In speaking of such runs, Mr. Melville said, "We look after the trucks whenever they are in the garage, but that is very seldom, in fact the inspectors of the International Motor Company, who are supposed to look over the machines once a month, are often not able to find the trucks at all, and practically all the inspection they have given them has been when they are on trips, and the inspector chased them up with a touring car, but we have had a great success with our machines, and have built up our business. We had such difficulty in finding a suitable place for the trucks with the large bodies, that on January 15, 1913, we bought the garage at 651 N. 42nd Street, where we are now caring for the trucks. This garage is 126 by 117, and has a capacity of one hundred trucks. We are caring for our own trucks there, and have a first-class and competent mechanic from the Mack factory in charge of repair work. We are making a special bid for commercial business, but of course take pleasure cars also."

When asked whether they were still keeping accurate records of the cars, Mr. Melville said, "No, we don't keep any records any more. For the better part of a year we did, but the trucks were out so much we found the man who was doing this work was guessing as to the quantity of gasoline consumed, etc., and finally after being thoroughly assured that the trucks were making good money for us, we discontinued keeping any further account, and as we now have three vehicles it would almost keep one man busy keeping track of things. Whenever a truck is reported after an inspection as requiring anything, we attend to it immediately. The trucks are driven very hard and very fast where conditions are favorable, but I do not believe our drivers are needlessly abusing the machines, but at any rate we are getting the work out of them. We are using United States tires, and have found their service very good in Philadelphia. We carry a spare demountable solid tire on the truck so that we can instantly replace one when necessary. We even have extra wheels, or if these are in use and a truck is disabled for a wheel, we jack up another truck, take the wheel off and get it there as quickly as possible. Speaking of service, why I have known the tire people to send a needed tire by taxicab as far as Bristol, Conn., at night, so that we wouldn't be held up.

"I think the worst mess we ever got into was in New York City. At 12 o'clock on a Saturday night one of our machines, heavily loaded with furniture at 20th and 4th Avenues was struck by an electric car and the whole rear construction wrecked. We immediately got in touch with the United States Tire people, and although it was 12 o'clock on Saturday night, they had us going again by 7 o'clock in the morning, which was Sunday, and we delivered the goods."

In speaking of drivers, Mr. Melville said that they were paid $16 a week. There were no bonuses or docking, and he also said that he had no trouble in getting men

Milbourne Company's Truck and Trailer

to handle the machines, in fact one of his drivers has been with him now for over ten years, as the business was formerly done with horses. "We load the trucks to the limit and then put on a trailer. We believe in getting all the work out of them we can within reason, and have at times attached as high as three loaded horse vans behind one of the trucks. We have lugged a single trailer 50 to 60 miles into the country successfully."

The trailers are attached simply by hooking the end of the tongue on to the rear, fastening same with a chain and then roping it securely.

Although these trucks are pushed to the limit they are not allowed to go with any vital part of the mechanism out of condition, and the service shows what can be done. As Mr. Melville said, "You can see what I have done with them, when I started with practically nothing 17 months ago, with the exception of a few horses and wagons, now I own these machines, the garage, and still have the horses and wagons, and my business is growing every day."

Miller North Broad Storage Company Tells Experiences and Gives Advice

When Mr. Miller of the above company was asked about his use of trucks he said: "After three years' experience in the use of commercial cars in the transportation of household goods I will attempt in a few words to relate our experiences which may be useful to the contemplative purchaser.

"Automobiles are of most service upon good hard roads, long distances and where quick deliveries are an advantage. They are not, however, to be compared with the horse in short deliveries. By short deliveries we mean within a radius of 3 or 4 miles from starting point, nor are they useful in soft ground. We believe, also, that an automobile is useful to the owner where a business is spasmodic, requiring an increase of equipment when least expected. Such as a business requiring for a short season a number of delivery vehicles which cannot be used continuously.

"In our business we have found it possible to make deliveries within 10 hours after loading, at New York City. Atlantic City within 6 hours, and comparatively short time on other points reached by the use of motor trucks. It, furthermore, has saved our patrons the cost of packing and crating, breakage, etc., which otherwise would undoubtedly have arisen if shipped by railroad or other transportation companies, as this method requires many handlings not necessary when using a motor truck.

"Every business man has his own conditions and he will find by studying the same that he can or cannot profitably use the motor for the delivery of his merchandise. Great care should be exercised in the selection of the car in order to avoid not getting too cumbersome a machine which would be costly, or on the other hand using too small or too light a machine which would be a disappointment to the purchaser as well as being costly by reason of the breakage which would undoubtedly occur should his machine be too light. We made a mistake in selecting a machine (our second) which was too light to carry the body and load. The result was continual breakdowns and annoyance.

"A most important item to the purchaser is the selection of a car manufactured by a reputable concern having a complete supply of parts, some of which will be needed before the machine is very old.

It is not the first cost of the machine that counts, but it is the repairs which make the operation of motor trucks expensive. A good truck, by one of the best manufacturers always has a market value, providing it is kept in good repair.

"Lubrication is not a big expense in operating a truck, except, where omitted or carelessly done. Gasoline is one of the cheapest items of expense in operating a motor car. Tires can be figured out to the cost per mile by reason of the guarantee given by all the tire manufacturers, and would add we have experimented with a number and have found the service of the B. F. Goodrich Company, the best and cheapest for our work.

Trucks Lower Long-Haul Costs

"An owner of an automobile in most cases under-estimates the cost of operation of same and by careless operation shows too little consideration for the machine.

"We believe in every user of an automobile keeping a complete and comprehensive record of the cost of operation and repairs, the miles run, etc. From these records if carefully studied he will find he can determine accurately by the cost per mile of operating his truck.

"The automobile is a new complicated and delicate piece of machinery, delicate, as compared with the stationary engine or motor, but not delicate when we see the way it is used. No engineer on a railroad train would run a locomotive a 100 miles at a rate of 50 or 60 m.p.h. without carefully going over same, examining each nut and bolt, before making the return trip, whereas, the user of the motor truck demands that his car be in continuous service regardless of its rate of speed, distance traveled, etc.

Selection of a Driver

"If a purchaser has decided upon his car, his next care should be in the selection of his drivers. Our experience has been that the best operators are men who have risen from the ranks in the owner's own establishment and without a knowledge of the petty tricks of many of the professional chauffeurs.

"We are now using four Packard three-ton vans and find it necessary to give them frequent overhaulings which is the only safeguard against delays due to minor breakdowns. Our mechanic frequently has to have an assistant, but we believe there is no better way to keep down the cost of operating machines than by keeping your own mechanic to look after same."

Three-Ton Packards Used by Miller Storage Company, Philadelphia

What Furniture Manufacturers, Dealers and Retailers Are Doing With Trucks in St. Louis

By H. G. BLODGETT

HAT do I think of the efficiency of motor trucks for the furniture man? That's another foolish question. Why, I could no more do business to-day without motor trucks than I could without a salesroom. I bought my first truck two years ago, another a year ago, and I'll be in the market for another soon. That's convincing evidence, isn't it?"

Thus spoke a man at the head of a large corporation, with a national reputation as a manufacturer, jobber and retailer of fine furniture.

We Must Have Trucks

No man could be more outspoken in regard to the importance of the motor truck in handling furniture than is Martin Lammert, of the Lammert Furniture Company, St. Louis. "We must have trucks," says Mr. Lammert. "The conditions under which we are doing business to-day are different from those of years ago. The population is steadily spreading over larger territory. The electric cars, the telephone and other business necessities are bringing customers to the store from miles around. And as a rule, in the furniture business, the deliveries which must go the greatest distance go to the best customers. The bulk of the better class trade to-day lives well out from the business district.

"So far as expense goes," continued Mr. Lammert, "I would not care if motor truck deliveries cost me three times what horse deliveries would cost. We must have the better service which the motor brings. I'm not one of those rabid systematizers who cannot rest without reams of tabular data and figures in his mind. Accordingly I have no broadside of statistics to be fired in behalf of the truck. But let's turn to the ledger here and see what we can dig out in a hurry.

"We have two trucks, both Packards, of three-ton capacity. One has been in service twenty-six months, the other eighteen months. From February 1st, the beginning of the present fiscal year of our company, up to October 1st, namely, eight months, the entire expense of operating these two trucks was $2104. This would make the expense on one truck $1052, or $131.50 per month. This is the average, then, for the eight months, and it includes absolutely everything that has been spent on the trucks, all gas, tires, oil, storage, drivers' wages and incidental expenses. It must be remembered that this is the total expense of operation of one truck which had seen ten months' steady service before this eight-months period began, and of another truck which had already seen service during a period of eighteen months.

"The fact that we are still using horses on some of our short haul work, especially around the warehouses, gives us a definite basis for comparison of the cost of the truck service compared with that of teams. The maintenance of a two-horse rig, many of which are much smaller than our motor trucks, costs $132.50 a month. This includes all incidentals, feeding, drivers' wages, shoeing, repairs, etc. Thus it will be seen that the cost of operating a two-horse rig, maintaining enough extra horses to keep it in service steadily, is a trifle more than the cost of operating a three-ton truck. But the average daily mileage of the horse drawn vehicle is sixteen miles, while the average mileage of one of the trucks is thirty-five. At approximately the same cost of operation one truck will cover more than twice the territory that a team will cover.

"There are other things to be considered, of course," went on this well-known furniture man, "because with figures a fellow can clinch almost any argument on whichever side he may want it clinched. Someone might argue that the interest on the original investment ought to be added to cost of operation. I don't do that because I charge that interest off to advertising. The charge is small considering the direct advertising brought by the trucks and also the increased patronage and good will which could not be obtained in these days in any other way.

"In addition it must be remembered that to-day service is the thing. We cannot give the service which the public demands without motor trucks. The truck gets over the ground and gets there on time. Suppose we have a delivery to make some ten or fifteen miles from the store. It is a long and almost impossible job for horses who have an early morning start, with the wagon loaded the night before. The truck will back up to the shipping platform at eight in the morning, will make this same trip and be back soon after noon ready for another. Yes, I expect to put on another truck within a few months."

One and a Half Ton Truck Does Work of Two Double Teams

J. B. Kennard, of the J. Kennard & Sons Carpet Company, St. Louis, and Fred J. Helge, in charge of the company's deliveries and shipping, are enthusiastic over the success of motor trucks in hauling their furniture, carpets and rugs. This firm has now replaced twenty-two horses, with the exception of a single one-horse rig, by three one and a half ton White trucks, all shaft driven. When asked as to the success of the shift to motors, Mr. Kennard said that the change had proven most beneficial. "One motor truck will do the work of two double teams," he continued, "and it will give quicker service and greatly increased efficiency at a cost of operation which is but a trifle more than the cost of maintaining one team. Our motor trucks give a yearly mileage of approximately 14,000 miles each, at a daily expense, including everything, of $6.15, while it cost us in the old horse days just about $6 to operate a two-horse rig each day."

Further going into the facts and figures of motor truck economy as shown by the Kennard Company's books Mr. Helge made out a most convincing case for the truck. "The books show," he said, "that for the year ending October 1st, it cost to operate one truck just $808.52, aside from the driver's wages. The driver drew $830 during the year, making the total cost of running the car $1638.52. This included $80 for new equipment, such as lights, etc., new tires costing $121.70, overhauling charges amounting to $4286 for work and $5.73 for replacements, gas, oil and all garage charges. For this $1638.52 this car was driven in the year approximately 14,000 miles. Two double teams, with eight horses, partly for reserve, would not have given us this mileage. But each of the teams would have cost us $174 a month, or a total for the two rigs for the year of $4176, as based on the figures in our books gained from many years of experience with horses. With sales increasing steadily in the suburban territory we seldom have to use the suburban express companies now. The motor trucks handle all of this work, enabling us to cut our bill for express service from about $50 a month down to an average of $2. When we put on our first truck we sold eight horses and two wagons. The truck did much more work than the two rigs could possibly do. We have now done away with twenty-two horses and our three trucks are doing the work cheaper and quicker.

"I fail to see where interest on investment, depreciation, or any of the other big bugaboos which we frequently hear mentioned have any important bearing on the case at all. For instance, take the price of a truck as $3300 and the ordinary figures allowed for depreciation, namely twenty per cent. To do the work of this car eight horses and two wagons will be required, and at present prices of horseflesh this equipment will entail an initial expenditure of $2200. A horse used in city delivery will depreciate about $2.50 a month, which, with the wagons, means depreciation almost up to that taken for the motor truck. If it costs more than twice as much to run the eight horses and two wagons than it does the single truck the difference in initial expense, amounting to but $1200, is more than wiped out during the first year. The difference in depreciation, total insurance charges, etc., are more than repaid by the motor truck during the first six months of the second year. Then during the entire life of the truck a clean saving is made in the cost of hauling. At the same time it must be remembered that the increased efficiency in delivery brought by the installation of the truck means

thousands of dollars in additional business to the store in these days of keen competition."

Furniture Manufacturer Uses Two Bodies

Among the furniture manufacturers, Levin Brothers, of Minneapolis, are proving the efficiency of the motor truck in handling their hauling in a most satisfactory way. Short hauls are the rule for the furniture manufacturer, from factory to warehouse or freight yard, and it is in the short haul with frequent loading and unloading, that the truck proves least economical. To make money on the investment the motor truck must be kept on the jump, and the way in which this result has been achieved by these furniture manufacturers with their Wilcox truck is most interesting. Their single truck is fitted with two bodies, one a plain platform bed and the other a regular box body. While a big load of furniture is being taken on some city delivery on the flat body, and the loads are piled so high that they barely miss hitting the trolley wires, the factory employes are loading the regular box body. This box body is fitted with four-inch ball bearing rollers and it can be easily pushed anywhere on the shipping platform that it may be wanted. When the truck returns the box body and its load is pushed into place on the flat body, a couple of clamps are set in place, holding the second body firmly, and with hardly a moment's delay the truck is ready with another load for the trip to St. Paul, the freight yards or another city delivery. This is a regular two-ton truck with 14-ft. bed. The driveway is of concrete and the loading platform is built exactly the right height to permit rolling the extra body into place. A pair of jacks placed beneath the rear of the car, relieving the weight of the new full load from the springs, holds the car rigidly so that there will be no undue jarring when the weight of the load is applied.

Trucks Increased Business One Hundred Per Cent in One Year

This has been accomplished by Charles F. Short & Company, of East St. Louis, Ill. Mr. Short declares that motor trucks increased his business one hundred per cent in one year. Explaining this statement he continues:

"The addition of trucks to my business increased the radius of my operations from fifteen to ninety miles. Yes, I would go anywhere with a load of furniture now, even to Chicago. One of my Wilcox trucks will do the work of two four-horse teams, and it will handle many a job that could not possibly be done by horses. A jaunt of from 35 to 90 miles over the country roads of Illinois after a load of goods, to be followed by the homeward journey, is nothing. Formerly a thirty-mile trip, 15 miles each way, was a pretty stiff proposition with horses. I believe thoroughly in the doctrine expressed in the words 'Keep the truck moving.' Slow loading has been the ledge upon which many a furniture mover has gone aground in adapting motor trucks to his business. When I was using teams I only sent two men to do the loading, which required for the contents of an average house, 3 or 4 hours. With my trucks I send four or five men and they do the work in an hour. By cutting the stops down to a maximum of one hour a good truck will make money for any moving man on any kind of work. I say without hesitation that motor trucks, the first year I used them and did away with horses, doubled my business, and that means my profits."

St. Louis Furniture Companies Use Trucks

Upper right—The White truck of J. Kennard & Sons, furniture and carpet dealers, showing the truck with full load. Lower center—A group of White trucks which have replaced twenty-two horses, in the service of the same company. Upper left—Removable side body panel used on a Gramm truck by Gustave Roos. Lower right—A large Packard truck of St. Louis furniture house. Center—Type of closed-in body with driver's compartment, on Wilcox Trux. This machine doubled a moving business in one year. Lower left—Two of the large capacity trucks of the Lamnert Furniture Company, backed to the unloading platform.

Commercial Cars Are Furniture Business Builders

Experiences of Furniture Houses Using Trucks in New York City and Vicinity

By CHARLES B. HAYWARD

WHILE it is possible to save just as much in delivering furniture with the commercial car, compared with horse delivery, as it is in any other line of business, the furniture man dwells less on the subject of economy when you talk motor truck with him than he does on almost any other point. Some men look at the fifty cent piece a thing is costing them and they hold the coin so close to their eyes that it totally obscures the dollar and a half of profit that this expenditure of half a dollar is bringing them. This viewpoint is more or less general with merchants and manufacturers when the subject of motor delivery is up for consideration, so that it is quite a relief to find that it does not obtain where manufacturers and dealers in furniture are concerned. On the contrary, it is one of the last things considered by those who have already had a demonstration of what the commercial car can do for their business. In not one of a dozen or more representative houses approached on the subject was the question of economy considered of sufficient importance to go to the trouble of compiling comparative data, though this easily could have been done as practically all of these houses still operated some horses.

Motor Trucks Cannot be Compared With Horses

That is, it looks as if it could be done very readily, but a little consideration of the subject from different angles makes it look a bit more difficult. "We have never attempted to compare our motor truck delivery costs with our horse wagons," said J. A. Farnam, manager of the delivery department of Ludwig, Baumann & Company, New York City, in answer to a query on this particular point. "In the first place, there's no equitable basis on which they can be compared. It wouldn't be fair to take the maximum a horse and wagon can do and then compare the performance of one of our big trucks within the limits of the same radius. We would be putting the horse's best against the truck's minimum. Our trucks can do so much that the horses can't do at all that it's a wonder to me why anyone should ask that question, though I suppose it is natural where a man has had no previous experience with trucks. At any rate, it has never interested us in the least. What we are interested in is the dividend that each truck pays. This takes three forms, absolutely satisfactory service on long distance delivery, increased business and excellent advertising.

"I'll give you a good example of the first," went on Mr. Farnam, "because it permits of a comparison being made with former methods. During the past week we sent a full load to Newburgh, N. Y., on our three-ton Packard. We loaded the furniture right at our door at this end and put it right in the rooms of the customer at the other and unless you've been in the furniture business yourself you can't begin to realize what that means to the customer. The distance is about 70 miles or call it 150 miles for the round trip to make it easy figuring. Counting the wages of two men and including all other expenses, 15 cents a mile certainly ought to cover everything. That makes it cost us $22.50 for delivering a load of furniture worth in the neighborhood of $500. Five years ago, before we had our motor trucks, that would have cost a great deal more. In the first place, we would have to crate every piece in the shipment. A poor packer is expensive labor in the furniture business and we get the best we can. It would have taken close to two days to crate that shipment and wages plus material would have come pretty close to $20. The crates take up so much more room than the knock down furniture itself stowed snugly in a motor truck, that two of our horse teams would have been necessary to take it down to the pier. Leaving here at 8 A. M. it would have taken the two wagons an hour to get down to Franklin Street. There's always such a line at the pier that they would have to wait anywhere from 1 to 2 hours before they could unload. It would be half past 12 or 1 o'clock before they got back to the store. That means half a day for two men, four horses and two wagons—at least $10. The freight on the boat would represent another $5, and then there would be as much more again for local delivery at the Newburgh end.

Freight Shipments Expensive

"That brings the total expense of the shipment around $40, granting that everything goes through without a hitch. But the customer has to uncrate all the pieces, put them together and pay to have them put in place. We don't make any more mistakes in this business than people do in any other, but they will occur at times. Suppose the customer complains about one of the pieces. It may be that it hasn't been put together right and there's a kick about it being unsatisfactory. We can't straighten it out by correspondence. We have to send a man up there to fix it. Result one day's time and $5 traveling expense—another ten-dollar item to be charged against the delivery of that invoice. That is, if our man can settle things. Frequently, he has to recrate the piece and ship it back. We have to stand freight both ways on this and the cost of shipping another in its place. Sometimes the customer decides that she doesn't like a piece of furniture when she sees it set up in her house and decides she'd rather pick out something else. Sounds unreasonable, of course, to make us stand the expense of changing it, but we have to do it just the same. Before we get through with a case of this kind, it may have cost us $75 for delivery and a lot of time that might better have been spent in doing other things."

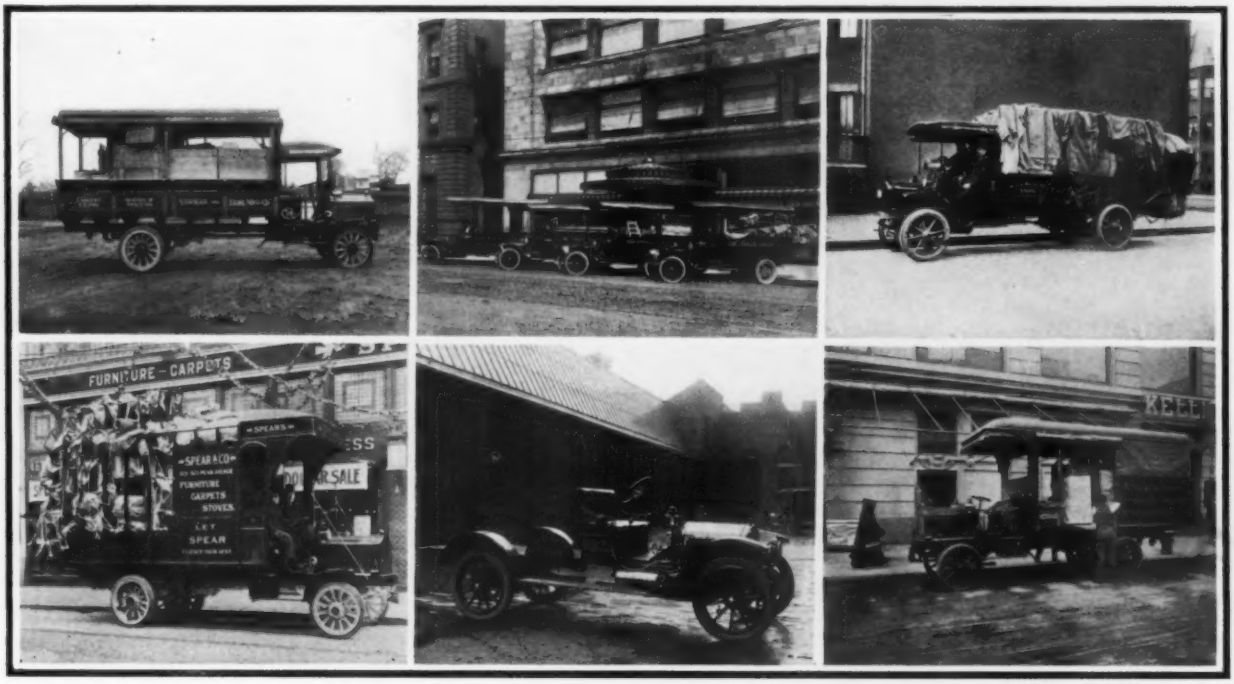
"We operate four trucks, a three-ton Packard bought in 1910, a ton and a half truck of the same make purchased in the following year, and two G. M. C. two-ton trucks bought last year, and we keep them busy all the time. Each one of them averages 50 miles a day, 300 days in the year, so you can realize that they are not out of commission for repairs very often. We still operate twenty horse wagons and thirty horses but I don't believe we will ever buy any more horses. As fast as they drop out, they will be replaced by trucks. There's some question in my mind whether the truck can make purely local deliveries—that is within a few blocks to a mile or so of the store—as cheaply as a horse wagon, but I suppose the time is not far off when we will be doing all our delivery work by cars. In fact, we have been con-

Produce New Business

"Oh yes," added Mr. Farnam when reminded of his promise to give a little more detailed information of the dividend paying value of the Ludwig Bauman motor trucks. "Well, apart from the saving on such deliveries as the Newburgh shipment mentioned, there's the matter of new business. We're selling furniture to-day in places that we didn't know were on the map only a few years ago. All within about a hundred-mile radius, of course. We never had a customer in any of those places before we bought our motor trucks, so there's no question but what we owe every cent of a good many thousand dollars worth of business a year directly to the use of this equipment. Then, take the direct advertising we get from our trucks going to those places. Last summer we sent a load to Middletown, N. Y., about 100 miles away. Within three weeks we had a woman come in from there. The bill wasn't a full load so we offered to ship it by rail. But she wouldn't have it. Said she had seen our motor truck there only a short time before and insisted on direct delivery. Now that was a direct sale, part of the profit on which could be credited against the expense of that first trip. That shows you how hard it is to make any fair basis of comparison. Our shipping crated furniture to Middletown and having it delivered by a local truckman wouldn't have brought us another order in a hundred years. It simply means that we are now doing business in a territory represented by a hundred-mile radius, where formerly the bulk

of business was purely local. It has increased our sales wonderfully. Not long ago, we sent the three-ton Packard with a full load to Sag Harbor, N. Y. That's the extreme easterly end of Long Island, 120 miles away. That shows that our fifty-mile daily average is made up of trips of greatly varying lengths. We offer free delivery to New Jersey shore resorts as far as Point Pleasant, about 70 miles, thus covering everything from Seabright down through Long Branch, Deal, Allenhurst, Asbury Park, Ocean Grove and towns inland to Lakewood, there being nothing south of Point Pleasant and Lakewood worth reaching until you get to Atlantic City, which on a long trip. If his helper didn't know how to run the car, we might have to send a man 100 miles or more to bring the machine in. That wouldn't pay. But then our men have to be furniture handlers first and drivers next. That's why we have considered it a good investment to put some of our wagon drivers through school instead of hiring new men to handle the trucks. It's their knowledge of how to handle furniture and put it together that makes the truck delivery doubly valuable to us. In fact, to a certain extent, they're salesmen and they save the house many a dollar in the course of the year by making satisfied customers wherever they go."

livery is the fact that our own men handle the furniture right from the time it leaves our warehouse until it is set up in the very room in which it is to be used," said Mr. Murray. "The amount we save in claims must come pretty close to paying the operating expenses of at least one truck anyway. Take this load right here," he added, indicating a three-ton De Dion on the warehouse floor, loaded to the guards. "That stuff would make two and a half truck loads if it had to be crated. It's bound for Babylon, Long Island. We'd have to cart it way down town to James Slip to get to the Long Island freight depot, or take it over to Long Island City,



Examples of Commercial Car Service in Furniture Hauling

Upper left view shows one of the Yawman & Erbe Manufacturing Company's three-ton Packards—Upper center shows part of the Sterling & Welch Company's White Fleet—To the right is seen the two-ton White used by George L. Wilmot's Sons, of Worcester—The lower left view shows a typical load hauled by Spear & Company's three-ton Packard—Lower center, fifteen hundred pound White used by Ludwig & Company, of Wilkes-Barre, Pa., piano dealers—Lower right shows a three-ton Packard in the service of Kellner Brothers, of New York City.

is too far for a regular delivery service. That's much nearer Philadelphia. We cover Westchester County four times a week, and twice a week one of our trucks goes through the territory lying between New Rochelle and Stamford. The average load is about 1200 lbs. and each truck has replaced at least five horses and two wagons, beside cutting out one driver. We pay our wagon drivers $14 a week for single horse wagons, $16 for team wagons and $19.50 on the trucks.

"With one exception—a bright young fellow who paid $300 for his own tuition and went and got it on his own account, we have taken our wagon drivers and put them through a good school at our own expense. No, that means eight, not four drivers, because the helper on every one of our motor trucks is a licensed chauffeur as well. We believe in being prepared for emergencies. Our equipment is too valuable to us to have it tied up even temporarily. Suppose the driver were taken sick and got hurt when

"Tire trouble? No we've had mighty little of it. The tires with which the trucks were equipped originally weren't altogether satisfactory and we experimented with one or two makes before we hit it right. Now we're using Goodrich tires on all four machines. They're supplied to us on an 8000-mile guarantee and they do this or better so consistently that we've had no complaint to make."

It will be apparent from the foregoing that the benefits derived from the employment of commercial cars in furniture delivery are so numerous and so valuable that any comparison with former methods of delivery is wholly beside the mark. This is borne out in equal measure by the following instances, each of which to a greater or less extent, covers the same ground as that gone over by Mr. Farnam, though an interesting detail is added by Joseph Murray, delivery manager of the Grand Rapids Furniture Company. "The greatest advantage we find in motor de-

which is worse, and there our control over it would end. In ninety cases out of a hundred though, it would arrive at the other end O. K. But there's more risk of it being damaged between the time it arrives at the customer's place and the time it gets up into the house in the rooms it's intended for than during all the rest of the trip. We pack things mighty carefully and there's not much chance of their being damaged in transit. But when the crates arrive on one of those big estates, the job of unpacking them falls to a gardener or one of his dago or polack helpers. Those fellows are about as handy with a hammer as a mule is with his hind feet and they don't care much more where it lands either. Instead of using a nail puller to take the crates apart, they start in to hammer them to pieces and the chances are good that the hammer may land in the middle of a plate glass mirror or on a beautifully polished mahogany panel before they get through. Of course, the

gardener doesn't want to get himself in wrong and he immediately puts it up to us or the railroad company, which is the same thing. 'That's the way the things arrived.' You can't find hammer marks on a broken mirror, but even where they show on the funiture itself, it's hard to make the customer believe that he—usually she—was responsible for the damage. Even if you do, that doesn't seem to help much. In any case, it's up to us to deliver the furniture right in the customer's house in good condition, so that even if the gardener does all the damage we have to pay for it. That's where our motor trucks come in so handy. The cost of these long distance deliveries is actually less than by freight, when you consider the handling at each end, plus the railroad charges, and the furniture never leaves the hands of our own men until it is set up right where it belongs. If there's any complaint to make, they can usually straighten it out right then and there and where there is something wrong they can bring the piece back with them the same day and deliver another to take its place on the next trip out that way. It pays big returns in making satisfied customers, and if they didn't do anything else our motor trucks would be big money savers."

"No, there's no way that we can compare them with horses. We bought our first two-ton De Dion truck four years ago, and we've added one each year since then, except this year. They have displaced twelve horses, but we can't make any definite comparison in the expense acount because the cars are doing work that couldn't be done with horses at all. In addition to extending our delivery service to a hundred-mile radius they make it possible to keep up our deliveries on intermediate distances right through the winter. Formerly we delivered as far as 20 or 25 miles from the house with horses, but we couldn't risk that in the bad weather.

Furniture Loads Vary

"It's hard to average loads. No two of them are alike. Furniture doesn't weigh much for its bulk, but I suppose the weights would run from about 500 to 1250 lbs. That isn't much of a load for a two-ton truck, but then we can stow as much furniture on a two-ton motor truck as we can put on a horse truck capable of carrying twice that much dead weight. We start our drivers at $18 a week and give them a dollar more per week for each year of service, so that just now we're paying $18, $19 and $21 to the three men we have. They're worth the extra money as they get more experience. We've only had to tow a truck in once in 4 years, so that you see it pays. Our percentage of days out of service is very small and that's a good record when you consider that we send loads as far as Philadelphia—in fact, anywhere within a hundred-mile radius. Then, one of the biggest advantages we get from this long-distance work is the advertising. We keep our equipment up to the top notch of efficiency and fine appearance and that goes a long way toward impressing people favorably with the standing of your house and its product, don't you think so?" The interviewer was compelled to admit that this was a feature of commercial car service that many merchants did not appreciate at its full value. The paint and varnish and the spick and span appearance of the driver and his helper are an asset quite as much as the ability of the machine to get there and get back on time.

"We have never had any particular troubles with tires and find that both the Goodyear and the Goodrich which we are using on our trucks live up to their guarantees pretty consistently. We usually average 7000 to 8000 miles a set" concluded Mr. Murray.

While not a furniture manufacturing center in the sense that Grand Rapids is, a great deal of furniture is made in New York City and probably more of this necessity is distributed from the metropolis than any other single point in the whole country. That is, delivered direct from seller to consumer. The population within a hundred-mile radius of the New York City Hall will doubtless reach pretty near the ten million mark, and as one furniture man put it "all the people with money are moving out into the country" the demand for commercial car delivery is very rapidly on the increase. Some of the big houses have completely motorized their delivery service, a representative installation of this kind being that of W. & J. Sloane. They began by the purchase of four G. V. three and a half-ton electrics for local work in 1907 and these cars have been in constant use ever since. In 1910, sixteen White gasoline cars were added, some of these being of 1500-pound capacity while several carry 3,000 lbs. and one or two are of three-ton capacity, this equipment displacing seventy to eighty horses, and incidentally making a very substantial reduction in the cost of stabling. As this house, which is one of New York's old line establishments of almost three-quarters of a century's standing, specializes more on rugs and carpets than furniture, the loads are very much heavier. The average is about 2 tons and the daily mileage from 30 to 40 miles. To quote Mr. G. G. Kane regarding the value of the commercial cars over the old method of delivery. "Our chief benefit derived from the installation of motor trucks has been the great increase in our radius of delivery. We think nothing of making a seventy-five to one hundred-mile run in a day, whereas with horses such a thing was out of the question."

This corresponds pretty closely with the experience of other furniture houses in the metropolitan district, Kellner Brothers stating that their Packard three-ton truck averages trips of 50 to 125 miles daily, deliveries requiring a day's trip each way being nothing uncommon. The view of this truck loading in front of the Kellner establishment shows the usual style of body employed for furniture delivery. That it may be found a disadvantage to employ this type of body for such light and bulky class of merchandise will be apparent from the photograph of Spear & Company's three-ton Packard, showing it ready to leave their Pittsburgh branch with a full load. While this truck full does not begin to approach the load capacity of the truck, its bulk greatly exceeds the available room of a fixed top type of body. The special type of body shown in the picture was accordingly designed for this service by W. E. Stewart, traffic manager of the firm. In addition to the unusual height of the sides, the truck may be loaded to a considerable distance above them, the entire contents being well protected from the weather by a specially designed tarpaulin top which covers the whole after end of the truck. Spear & Company operate two three-ton Packards at their Pittsburgh store and find that the machines have opened up considerable territory which could not be reached in the days of wagon delivery. They average about 80 miles a day in this service and consume approximately 12 gallons of gasoline and 2 pints of oil each in covering this distance. How economical this delivery is may best be realized when the hilly nature of the suburbs around the "Smoky City" is taken into consideration.

Entire Horse Outfit Displaced

What can be accomplished by making a sweeping change from horse to commercial car delivery can be appreciated from the experience of the Sterling & Welch Company, of Cleveland. This was one of the first of the large furniture, carpet and interior decorating houses to place its delivery system on all motor basis and the results of three and a half years' experience,

Samples of Bodies Used in Furniture Business
The end illustrations show one and a half ton White trucks, while the center is a Mack

during which period the company has purchased ten trucks, have taken the form of greater delivery efficiency, increased business by reason of extended zones of delivery, to say nothing of the more satisfactory service rendered. This company's experience also throws an interesting side light on the oft-repeated question, "How long will a motor truck last?"

The major portion of this company's fleet consists of seven White trucks, three of 1500-pound capacity and four of the ton and a half size. The first purchase consisted of two of the latter type made in May, 1910. Two more of the same size were added a year later and in April of the present year, three 1500-pound White trucks were bought. All are fitted with the open type of furniture bodies shown on the four machines photographed in front of the store. Storm curtains completely protect the load. Speed is insured by the use of pneumatic tires.

The question of maintenance is one that has been handled by the company without assistance from the maker of the trucks. When the initial purchase of two machines was made, the company began to plan its system of maintenance on a basis that could be expanded with the increase in its equipment and insure the vehicles being in the best of condition at all times. Not one of the White trucks has ever been sent to the repair shops of the White Company convenient as the latter is to the Sterling & Welch garage. All repairs have been of a character easily handled by the firm's own men.

After three of the White trucks had been in service 2½ years and had covered approximately 40,000 miles each, they were overhauled at an expense of but $100 per car and put in efficient working condition. The company has arbitrarily assumed a working life of five years and has written off depreciation at the rate of 20 per cent. per annum, but the condition of the machines in question at the end of half this period gave no indication of decreased serviceability. This was in November, 1912. More recently, the first truck bought was given its second overhauling after having run 65,000 miles in a period of 3½ years. In other words, after having served 70 per cent. of its assumed useful life. The replacements necessary totalled but $35 and, judging from the condition of the car, it bids fair to continue in useful service long after its assumed life has expired. How much of this should be credited to the use of pneumatic tires is a question. Very satisfactory service has been obtained from this part of the equipment, the tires averaging 4200 miles.

Delivery Service Systematized

The delivery service is systematized quite as closely as the work of inspection and maintenance. Each truck is assigned to cover a certain territory, deliveries being made as far east of Cleveland as Willoughby, 19 miles, west to Dover, 14 miles, and south to Brecksville, 15 miles. These distances, however, give no idea of the mileage covered by each truck, as the machines do not merely run to these terminal points, but cover all the intermediate territory. They start out with full loads which are gradually lessened as the distance extends, deliveries being made direct in every case without any intermediate transfer or outlying distributing stations.

The nature of the business makes direct deliveries necessary, the merchandise being of such a perishable nature that careful stowage is imperative so that transfers would involve the loss of much valuable time. For this reason considerable attention is devoted to proper loading and each truck averages 30 minutes at the loading platform for each trip. Work begins at 7.30 A. M. and ends about 5.30 P. M., each machine making two trips through its territory a day, averaging 62 miles and 65 stops. When it is borne in mind that out of this ten-hour day, one hour must be deducted for loading, plus the time for the men's lunch and the delays involved in placing bulky or fragile pieces right in the rooms where they are to be used, the value of pneumatic tires for making speed between stops will be apparent. Likewise the extremely efficient basis to which this company has reduced its delivery system.

Apart from the replacement of forty to forty-five horses by the commercial cars the latter have enabled the company to obtain and keep the patronage of customers who could not be served efficiently or conveniently by horse-drawn wagons. The system is under the management of a delivery expert of long experience and progressive ideas and he loses no opportunity to improve the service wherever possible. All of the men were formerly in the employ of the company as horse drivers and they are considered much superior to the average professional motor driver recruited from outside. When the horses were discarded these men were given a special course of training at the company's expense, and having no preconceived notions or prejudices of motor operation, it was easy to instruct them in the proper way of doing things, while at the same time they became imbued with the company's ideas and policy.

It must not be judged from this, however, that the installation of a whole fleet of machines is essential to the attainment of efficiency. One unit can be handled quite as effectively and show as decided economy as a whole garage full. An example of this is to be found in the experience of Ludwig & Company, of Wilkes-Barre, Pa. Bad roads and steep hills made deliveries a difficult matter in the surrounding territory and horses were worn out so quickly that the company invested in a 1500-lb. White platform truck and discarded the five horses formerly employed. This was in April, 1910. Since then the car has traveled more than 19,000 miles, averaging 8.6 miles to the gallon of fuel and 381 miles to the gallon of oil, the maximum daily mileage being 91 miles. Pneumatic tires are employed and have given good service considering the nature of the roads, averaging close to 3500 miles. During this time the minimum number of pianos delivered per month has never dropped below 165, while it has reached 240 as a maximum. The only attention required by the machine in almost three years has been confined to ordinary adjustments and replacements, such as the tightening of nuts and bolts, regrinding of valves, relining of brakes and the replacement of one bushing in a steering connection. According to G. M. Snyder, the manager of the company, "The excessive braking required by the long, stiff grades and the unusual wear on the steering connections due to the extremely rough surfaces, are the logical results of truck operation in this region. The number of men required has been reduced from five to three, and the truck is less expensive to maintain than the equipment it replaced. Under no circumstances could the company be induced to return to the use of horses."

The experience of George J. Wilmot's Sons, Worcester, Mass., in the same line of business, coincides with the foregoing. A two-ton machine was acquired three and a half years ago, and in 1912 this was replaced by a White 1500-pound truck. This is kept busy delivering pianos most of the time, though a light load of furniture is occasionally taken on a long haul, trips being made as far as Springfield and return, a distance of 100 miles. The use of the small car showed a profit of $30 to $40 a day and was so sucessful that a three-ton machine of the same make was recently purchased. One truck and four men do the work for which four horses and eight men were formerly necessary. On long trips, one machine does the work of six horses. Here's about the way that Mr. Wilmot figured out the comparative cost of horse and motor equipment to do the same work.

Feed, etc., at 60 cents per day per horse..		$876.00
Two drivers at $12 per week each.....		1248.00
Depreciation, 20% on $1300 (horses).....		260.00
Depreciation, 20% on $800 (wagons).....		160.00
Depreciation, 20% on $140 (harness)....		28.00
Interest at 6% on $2240.....		134.40
Total for horses—per year		$2706.40
Gasoline and oil	$101.40	
Driver at $15 a week.....	780.00	
Tires (average 4000 miles)	250.00	
Depreciation, 20% on $2250.....	450.00	
Interest, 6% on $2250.....	135.00	
Total for one 1500-lb. motor truck		$1716.40
Balance in favor of truck.....		$990.00

The foregoing examples cover two or three branches of furniture delivery, the dealer, the manufacturer and the general store handling furniture and allied lines, where direct delivery to the customer is desirable to avoid the necessity of crating and rehandling. That motor delivery service is quite as advantageous in the case of the manufacturer who must pack his wares and deliver to railway terminals, is evidenced by the experience of the Yawman & Erbe Company, Rochester, N. Y. This company invested in two Packard three-ton trucks, one of which is illustrated by the accompanying cut. Each of these machines has replaced four two-horse teams and wagons. According to one of the officers of the company, their expense for haulage has been reduced by fifty per cent.

A Kissel Kar truck has won first prize for three consecutive years at the California State Fair. A feature of the exhibit that won the prize was the 1500-lb. delivery car which recently broke the record between Los Angeles and San Francisco. The official time of this truck over the 472 miles was 24 hours and 40 minutes, beating the best previous record of a loaded truck by more than 6 hours.

The Cost of Maintenance and the Responsibility of the Owner

By H. KERR THOMAS, M. I. M. E.

IT MAY now fairly be said that the gasoline commercial vehicle in this country has arrived at a stage of perfection where radical, progressive departures are alike unnecessary and undesirable; unnecessary because the vehicle as it exists to-day, at least in such cases where it is produced by responsible manufacturers, is a reliable money earning machine; undesirable, because although many improvements are possible, until further use has been made of the truck in many industries, it is not possible for designers to foresee the direction in which the modifications are most called for.

Standard Form of Truck Now Accepted

The general types assumed by automobile trucks have gradually crystallized into one general design. For the present, it is accepted that the common form is on the whole most suitable for the purpose, that is to say, a vehicle running on four wheels with a motor at the front end, the necessary transmission gear unavoidable with a gasoline motor, and a rear axle through which the power is delivered to the ground. As in all other branches of engineering, there are several ways of working out the details. Thus, the final drive at the rear axle can be by means of a live axle or by means of chains. The general type of transmission gear does not allow many alternatives to the designer. The same applies to the clutch and still more to the motor, which apparently will remain for a very long time, a four-cylinder vertical engine working on the four-cycle Otto principle. There is little choice also in the style of the frame. It may be partially rigid or it may be wholly flexible. The designer, having selected one type, is guided by his experience in making the necessary provision for stresses which will be set up in the various parts of the mechanism which have to be bolted to the frame, and he will provide what, in his judgment, best eliminates distortion in the various important units of the truck.

All of this has been done and there are trucks of very different types being produced by manufacturers of the highest standing in the country. Time only can decide which type or which types will be the fittest survivors. As in every other branch of engineering, it is almost certain that the final development will not be confined to a universal design because assuming an equal amount of knowledge and experience on the part of two designers, if they are working independently, they are certain to do so on different lines guided by their own individuality and the results though equally excellent will be different.

The problem then before the manufacturer is not now that of designing a serviceable truck. It is rather one which possibly has more of a commercial aspect, one which taxes rather the administrative than the technical staff in the employ of the manufacturer. In other words, having taught himself how to make a truck, he is now facing the harder problem of teaching some one else to use it. In the anxiety of producing a reliable vehicle which will be a credit to him, in the excitement of passing through the experimental period, and in the exacting work entailed in organizing for the production of the vehicles on a manufacturing scale, it is excusable if the manufacturer has lost sight of the fact that he is producing an extremely beautiful piece of mechanical engineering, which, as soon as it is out of his hands will be regarded by the user as a wagon, which it never is and never can be.

Majority of Users Not Familiar With Machinery

The reason for this is not far to seek. It is not too much to say that any maker of machinery will distribute his product by means of the railroad or the steamer. The weight and bulk of his product admits this except in a comparatively small percentage of cases. Hence the machinery maker, the manufacturer who is naturally best able to appreciate the mechanical qualities of a motor truck is in the minority among the users of the same. The large users of trucks are concerns handling general merchandise such a coal, flour, building materials, and more broadly, express companies and haulage contractors, the latter in very largely increasing numbers. Now among all these businesses, all of which have possibly been established for many years, some undoubtedly for generations, the haulage has been on a retail scale, that is to say, comparatively small shipments which have been taken care of by one or two horse-drawn wagons. Seeing that the wheeled wagon drawn by horses or oxen dates from the time of the early Egyptian dynasties, it is only to be expected that the shifting of freight by means of wheeled vehicles should have drifted into rather deep grooves. The methods of horse traction have become hereditary and herein lies the difficulty which, before motor traction can finally supercede the primitive method, must be removed by correction of existing ideas.

Let us take the simplest case as an example. A small haulage contractor possesses himself of a four-wheel wagon and a horse. He works up a small though profitable business. He purchases food for the horses and on very rare occasions, grease for the wheels of the wagon and with this simple equipment he earns a regular income until the horse falls sick. He immediately is faced with the difficulty of cancelling his engagements, to save which he goes to the nearest farmer and hires a horse until his own is again fit to work. Fortunately, if the horse is carefully looked after and not overworked, this does not occur very often, but when it dies, there is no more discontented individual than its owner. The wagon he has purchased can be run for many years without so much as a coat of paint or a single repair being carried out upon it. The worst thing which will probably happen is that after several years' work, a tire will become loose on the wheel. When this happens, the blacksmith across the road will shrink on the tire in three-quarters of an hour and the wagon is as good as ever. A precisely similar state of things occurs to the haulage contractor in a larger way of business. At the end of the quarter, he will pay a bill to the veterinary surgeon who has attended his horses. He will also pay for hay, corn, etc., and practically nothing else except labor until after two or three years it occurs to him that his vehicles will look better if they receive a coat of paint. This though is probably suggested on advertising principles alone. The most intricate piece of machinery to be found on the premises of this last named haulage contractor is probably the chaff cutter, a piece of apparatus which is not very complicated and when it gets out of order can be repaired by the least intelligent person in his employ.

This man suddenly purchases a motor truck. Equally suddenly he is dazzled by the fact that he can handle with his truck vastly more work than he could with his horses. He has purchased the truck from a reliable house with a quite childlike confidence in the power of the manufacturer to shield him from all accidents which may occur to the truck through ignorance or carelessness of his own employees or from collisions and damages caused by others, out of his control. The man is not to be blamed. He has never used machinery; he does not understand that no machinery will work unless it is incessantly cared for and he has not learned that pieces of the machine when sold separately cost a considerable amount of money. He is faced with another trouble. The manufacturer of the truck is perhaps five hundred miles away from him. When something breaks and requires renewal, he finds that he has to wait for several days while the part is in transit to him. This is perhaps the bitterest disappointment of all and the fact contrasts most unfavorably with the half-hour's visit to the blacksmith across the road, under the old régime. The first experience of this kind is a disappointment; the second, an annoyance; and when the third occasion arrives, the owner has lost his temper, declares that the negligence of the manufacturer has lost him a week's business, and protests that he will not pay for the piece when he gets it. The immediate result is threefold. The manufacturer thinks the owner is unreasonable; the owner feels that he is being treated at best, negligently

by the manufacturer; and worst of all, his faith in the truck is seriously shaken and with it has come a general disbelief in the possibilities of trucking by mechanical means.

Failure of Manufacturer to Instruct User

All this unfortunate situation has come about from one fact and one fact only—that the user of the truck without any previous experience has unconsciously entered a new field, and has become a *machinery user*. He does not know anything of the risks attendant upon running machinery of any kind, and through failure on the part of the manufacturer to instruct him in this, every such owner is disappointed. The manufacturer has not been far sighted enough to see that besides changing the whole *apparatus* used by the contractor, he has to change his whole *habit of mind* and teach him to look at his stock in trade from an entirely new angle. This is admittedly not such an easy task and what applies to the elementary method of the haulage contractor does also in a very slightly less degree to those engaged in the other lines of business already mentioned.

The future of the truck industry is no longer in the hands of the manufacturer. Its further development has been transferred to the user.

The question of the economy of a motor truck is one of such cold, hard facts that the most skeptical cannot possibly disprove them. The future expansion of the industry depends on the good will of the user and his good will being so easily shaken by disappointments, it surely becomes a matter of the first importance to the manufacturer from the most selfish point of view of his own pocket book, to assist in every way in the conversion of the user of horses into the user of machinery rather than the proprietor of horses into the possessor of a motor truck. The difference is a subtle one, but on it hangs, nevertheless, the future of the motor truck industry in this country.

PIPE HAULED AT A BIG SAVING WITH TRUCK

Motor trucks in the service of Frank Phillips, a prominent Cleveland contractor, who has the hauling contract for the United States Cast Iron Pipe and Foundry Company, not only effected a big saving in the cost of hauling, but increased the volume of his business by extending the area in which he could operate profitably. In the latter part of January, 1911, he purchased a three-ton White truck, and, basing his action upon the experience gained in seven months' use of this truck, he purchased another White of five tons capacity. These trucks, he has found, equal the tonnage of six teams that he formerly used. The three-ton truck has covered 26,000 miles and the five-ton has run 15,000 miles.

Before making this installation, Mr. Phillips was doubtful of the adaptability of trucks to his business owing to certain conditions that were peculiar to his own surroundings, but a brief period of operation not only convinced him that he had made a good investment, but also made him very enthusiastic over motor hauling.

In beginning the use of motor trucks, Mr. Phillips feared that they would not be practical in the bad roads for a half mile around his plant and yards. In carrying pipes to the outlying sections of the city over rough, unpaved roads, he had been compelled to use two teams to get a load of three tons through the bad places. In order to satisfy himself that bad roads would be no barrier to the trucks, he placed a load of four tons on his three-ton truck and watched the result. The truck proved equal to the task of carrying its rated load and a considerable overload as well. Therefore, in the extremely bad weather of January and February, he loaded his truck so as to "break" the road for the teams, and thereafter gave no thought to the question of roads. In fact his business rapidly expanded beyond his original zone of operations, and the seven-mile radius in which his work was formerly concentrated was enlarged to fourteen. With his three-ton truck he has hauled as high as 519 tons per month. On a particularly busy day it covered 96 miles in ten hours, which is regarded as highly creditable in view of the yard, road and traffic conditions.

Month.	Days.	Miles.	Gasoline.	Oil.	Grease.	Incid'tals.	Repairs.	Pounds Hauled.	Tons Hauled.
January	4	47	18 gal.	1.5 gal.	....	....	....	35,912	17.95
February	21	866	152 gal.	6.0 gal.	$2.00	$3.00	$2.47	380,000	190.00
March	26	1238	214 gal.	11.5 gal.	2.00	1.00	11.30	527,885	263.94
April	23	1214	192 gal.	7. gal.	2.00	.50	7.15	510,800	255.40
May	26	1109	172 gal.	9.5 gal.	0.00	1.00	6.95	966,575	483.28
June	6	1187	189 gal.	9.5 gal.	2.17	4.00	0.00	1,038,150	519.07
July	21	1020	166 gal.	10.25 gal.	2.00	2.00	17.20	527,330	263.66
		6681	1103 gal.	55.25 gal.	$10.17	$11.50	$45.07	3,986,652	1993.30

Tires	$160.00
Driver	360.00
Gas	132.36
Oil	19.34
Grease	10.17
Miscellaneous	11.50
Repairs	45.07
	$738.44

Miles per gallon of gasoline	6 Miles.
Miles per gallon of oil	121 Miles.
Average daily tonnage	20317 Lbs.
Average daily mileage	45.45 Miles.
Total cost of operation per day	$5.02

Figures for a six months' period, which are fairly indicative of the results he obtained with his three-ton truck in winter, spring and summer traffic, show a total of nearly 2000 tons hauled in 147 days with a speedometer reading 6681 miles.

The above figures are the actual operative and maintenance costs with the exception that depreciation, interest and insurance are not included. However, they are sufficiently complete to give a clear idea of operating conditions.

White Truck Hauling Pipe

This is a three-ton machine used by a Cleveland contractor in hauling iron pipe on contract

BAKER USES VERY LARGE BODY

What is believed to be the largest automobile truck in the world has gone into service in Troy, N. Y. With a wheelbase of 17 ft. and a body 7 x 9 x 18 ft., it has a capacity of 6740 loaves of bread, 6 tons. Firestone Hard Base Removable tires are used. The truck is the first of several to be installed by the Charles Freihofer Baking Company, of Troy, Albany and Schenectady.

G. H. Duck, well known in the sales end of the truck industry, whom we reported in our last issue as having accepted a position as assistant to the advertising manager of the Locomobile Company of America, at Bridgeport, we are informed, is sales manager of the New York Truck Department of the Locomobile Company of America, and is located at 2156 Broadway, New York City.

Worm-Drive Truck Added to Lippard-Stewart Line

THE Lippard-Stewart Motor Car Company, Buffalo, N. Y., has increased its line of trucks by the addition of a one and a half-ton worm drive truck, designated as Model F. In producing this truck, the Lippard-Stewart Company has followed the same principles of design which contributed so heavily to the success of the 1500-lb. model, which has been manufactured since the Buffalo concern's organization, and, in addition, many new features have been adopted which show careful consideration of the requirements of a truck of its capacity as well as design, of recognized advanced type. In particular is the use of the worm drive rear axle an evidence of the conformity of the truck's construction to the trend of modern practice in commercial cars of medium and heavy load ratings.

The Motor

Judging from the ample power of other Lippard-Stewart models, the motor of the new truck would be expected to be built accordingly, and so it is. Of Continental manufacture, its general characteristics are well known. With L head cylinders of 4½-in. bore and 5½-in. stroke the motor develops 35 h. p. at speed of 1200 r. p. m. Cylinders are cast en bloc with a compartment provided for the complete enclosure of the valve mechanism.

The motor's long stroke, with other refinements, such as current balance and crankshaft of especially liberal size supported on three large plain bearings, are strong factors in the smooth running qualities. Inspection and occasional adjustment are simplified by the convenient location of carburetor and magneto and the apparent elimination of complications. An automatic governor of the centrifugal type is mounted on the motor and is operated from the pump shaft. It is connected directly to the intake manifold and is so set that the speed of the car is limited to 15 m. p. h. Three point suspension is secured by supporting the front of the motor on a trunnion and extending the rear motor arms directly from the crank case to the main frame. The bearing of the trunnion is of bronze and is provided with a grease cup for lubrication. The protection of the mechanism and the flexibility secured by the use of this construction follows a general scheme to this end which is evident throughout the entire design. In the ignition system neither batteries nor coil is used. The source of current is high tension Eisemann magneto, with fixed spark, which eliminates the hand control of the advance. The spark occurs at a point predetermined by the manufacturers to be best suited for all around requirements. The carburetor used is a Rayfield with automatic auxiliary air valve and separate adjustments for high and low speeds. An attachment on the dash operates on the needle valve to facilitate starting and cold-weather running.

The Radiator and Method of Suspension

The radiator is mounted upon coiled springs. The cooling water is circulated by means of a centrifugal pump.

The radiator is of the built-up type. The tanks are of cast aluminum, the upper one of which has cooling flanges extending from its surface. Into the tanks are fitted a large number of copper tubes whose radiating capacity is increased by the customary metal fins. The cooling water is circulated by a centrifugal pump. Although the likelihood of damage is practically eliminated because of the protection offered against collision by supporting the radiator at the dash on coil springs, still repairs when necessary can be made very readily. The tubes are easily accessible, and besides, are arranged in two distinct groups, on the right and left of the radiator, so that either nest can be removed and replaced by a new unit, while the other is being set right. The air which circulates through the radiator passages is drawn by a fan consisting of blades attached to the periphery of the flywheel. The lubrication of the motor is on the same principle as used on this company's 1500-lb. model. From the compartment in the base oil is forced positively through copper tubes by means of two plunger pumps mounted in a crank case to each main bearing and the timing gear case, the overflow from which drains into pockets, into which the connecting rods dip. The splash produced in this manner lubricates the cylinder walls and piston pins, after doing which the oil drains back through a strainer into the reservoir and is pumped over again and again through the same course. A gage fitted to the lower half of the crank case indicates at all times the quantity of oil in the tank.

Clutch and Transmission

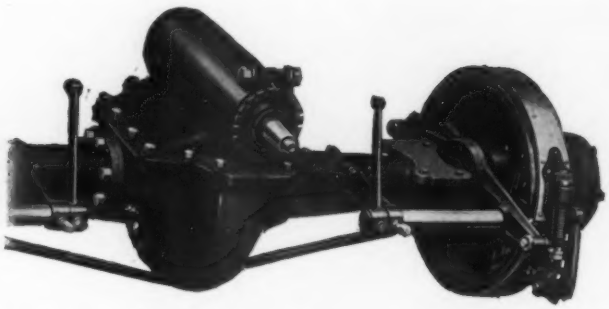
The clutch is a leather faced cone, which is made of pressed steel. Flat springs are located underneath the clutch surface in order to give gradual and positive engagement. The size of the transmission and clutch is in excess of the motor rating so as to furnish reserve strength to withstand the usual hard usage which is placed on these units, especially in truck service. Both these units are made to transmit 50 h. p. The selective transmission is of Brown-Lipe manufacture and has 1 in. face gears which are carried on shafts mounted on Timken roller bearings. The location of the clutch and gear box is immediately underneath the floor boards where the units can be easily reached.

The Drive

Instead of using one continuous shaft from the transmission to the rear axle, Lippard-Stewart designers have divided the drive line at its center and have supported the rear end of the forward half on a self-adjusting ball bearing, which is carried in a cross member of the frame. This construction makes the shafts well within practical working length and at the same time prevents all deflection. When the truck is loaded, power is transmitted to the rear axle through a straight line and any slight angularity produced by the spring action is taken up through Spicer universal joints, one of which is placed immediately back of the transmission and one at each end of the rear half of the propeller shaft.

The axle is of the full floating type manufactured by Timken, in connection

with David Brown Sons Company, English manufacturers and patentees of the worm and gear made use of. The worm is made of steel and the gear of bronze, both materials being of special composition. These two parts have their tooth surfaces ground to perfect contact and are assembled as a unit with the support a part of the axle housing cover. In this manner, it is claimed, perfect alignment is always assured and the differential is easy of access. The axle housing consists of a cast steel differential case, to which are bolted by heavy flanges two tapered tubular members of the same material. The entire axle housing is strongly ribbed and trussed. The drive shafts are fitted with flanges through which the driving effort is supplied to the wheels. Timken adjustable roller bearings are used throughout. Lubrication of the worm shaft bearing is accomplished by casting troughs in the housing which catch the oil as it is picked up by the worm and carry it directly to the contact surfaces. Cleaning holes are provided to allow the worm and gear and differential housing to be washed out at proper intervals. The front axle is a Timken heavy duty type of customary I-section reinforced to a solid rectangular section at its center. Wheels and steering knuckles are mounted on Timken bearings.



The David Brown Worm as Mounted on the Lippard-Stewart Rear Axle

Rear Axle, Spring and Brake Construction

Brakes, Frame, Etc.

Both sets of brakes are located on the rear wheels and act on a single pressed steel drum 17 in. in diameter and 2¾ in. face. The externals, or service brakes, are applied through equalizers.

The truck's frame is so arranged that bodies from 10 ft. to 12 ft. in length can be mounted without overhang. The optional wheelbases, 145 in. and 158 in., make it possible to secure a load distribution of 30 per cent. on the front wheels and 70 per cent. on the rear with all types of bodies. At the point where the greatest strain comes, the channel section is 6 1-16 in. x 4¼ in. wide, ¼ in. alloy steel being used in both side and cross member. By means of a special hinge connection to the side channels, the front cross member is made detachable so that when it is required to move the motor it can be readily drawn forward on two skids placed on the front end of the chassis. Two other cross members are placed fore and aft of the transmission and act as a support for this unit. A fourth cross member attached by heavy gusset plates is located about midway of the frame, while a tubular tie rod extends across the frame at its extreme rear. In front of the radiator the frame is inswept so as to permit of a small turning radius.

Other Details

Steering is done from the left side of the car. A worm and gear type of device is used, which is fitted with an 18-in. wheel mounted on an aluminum spider. The drag link connection with the steering knuckles has ball and socket joints with spring buffers. The hand lever connected to the carburetor is the only motor control attached to the post.

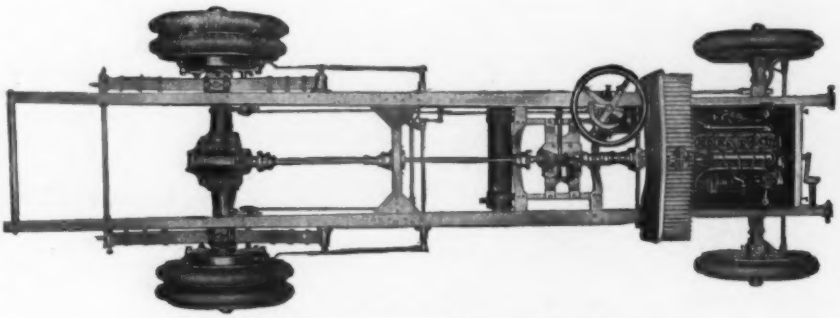
Each unit of the mechanism is independent of the others and in case of repairs or replacements can be removed without disturbing other parts. The motor is located in front of the driver's seat under a hood of the sloping type, which, when swung upwards, exposes power plant for convenient oiling or adjustment. The magneto and carburetor are readily detachable and within easy reach. Both the clutch and transmission are accessible through the floor boards. The clutch can be withdrawn without removing either the motor or transmission, while the latter can be dropped through the frame to the floor. The mud pan is retained by a clamp and wing screw and when necessary can be loosened and pulled forward along the frame so that the lower half of the crank case is exposed, and when detached, the motor bearings are brought within easy reach. Throughout the car oiling devices are used liberally. The spring bolts are lubricated by means of a cup and felt wick, which extends the entire length of the spring bolt.

The Lippard-Stewart Company supplies bodies to suit a variety of uses. When the chassis alone is purchased, a driver's seat and front mud guards are supplied as part of the equipment. The gasoline tank of 20 gals. capacity is also included, as well as the usual tools and tire repair kit. The price of the chassis is $2300.

NEW LUCK TRUCK

This is a new truck brought out by the Cleburne Motor Car Manufacturing Company, Cleburne, Tex. It has a 1000 lb. capacity, and sells at $850.

The motor is four cylinder, 3½ in. bore and 4¼ in. stroke. It is located forward right behind the radiator. A short hood, which extends from the dash to the driver's seat, completely encloses the motor. By removing this



Top View of Lippard-Stewart Truck

Motor is located under the sloping hood. Radiator is fin top and forms part of dash. Drive is on left side with center control. A worm drive is used

hood, the motor is rendered accessible for inspection, etc. Valves are adjustable and enclosed. Large hand holes are provided for adjusting the three bearings on the crank shaft, etc.

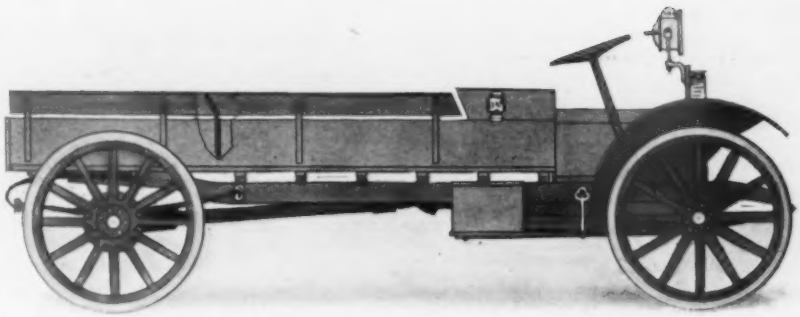
Lubrication is effected by a force pump, located in the crank case base. It feeds oil to the bearings. From there the pistons, etc., are lubricated by splash. A new Remy dual magneto and dry cells are used for ignition. Cooling is by flat tube radiator with water circulation system and a fan.

Motor and transmission are a unit. The transmission is of the selective type, affording three speeds forward and one reverse, with direct on third. Ball bearings are used throughout.

Drive is by an enclosed shaft to the rear axle. The differential is Brown-Lipe make, carried on Hyatt roller bearings. It affords a 6 to 1 reduction. The spindles are 1⅜ in., chrome nickel steel. The front axle is drop forged I-beam, with extra heavy steering yokes, fitted with ball bearings at top.

Four contracting brakes, operating on 12 in. drums are used. Front springs are 2 x 36 in., semi-elliptic; rear springs are 2 x 44 in., three-quarter elliptic. Wheels are 34 in., with 1¾ in. spokes, heavy hubs and felloes. They are fitted with solid tires 2½ in. front and 3 in. rear.

Frame is channel section steel, 3-16 x 1¼ x 4 in. Regular body size is 3 ft. 6 in. wide and 7 ft. 6 in. long, inside measurement back of seat. It is fitted with floor boards. Steering is by a 16 in. wheel, located on the right side, beside the motor. Control levers are in the center. Regular equipment consists of three oil lamps, kit of tools, one large swivel gas head light on the dash, and generator. Wheelbase is 115 in.; tread 56 in.



New Luck Truck

Capacity, 1000 lbs.; $850. Wheelbase, 115 in.; tread, 56 in.

Jeffery Quadruple-Drive Truck

A QUADRUPLE drive truck of 3000 lbs. capacity and designed to meet the requirements of the United States Army service is being built by the Thomas B. Jeffery Company, of Kenosha, Wis.

One of the novel features of the truck will be that all four wheels and brakes will be interchangeable, and the two axles will also be interchangeable. The motor will be under the hood and the gear change in the center.

The Motor

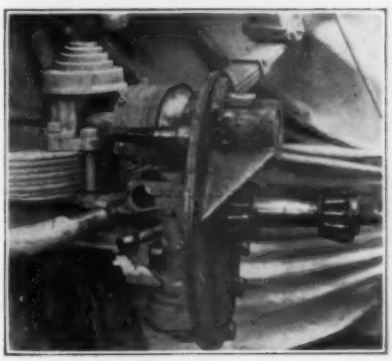
The motor is four-cylinder block type, 3¾-in. bore and 5¼-in. stroke, with extremely large bearings throughout, spiral gears operating the cam shaft. Special attention has been given to large water space in the cylinders to insure uniform cooling of the cylinder walls. The exhaust is carried away quickly through a very large manifold. The reciprocating parts are light in weight and perfectly balanced, insuring long life of the motor under hard work. The motor embodies the very latest approved practices of the most successful motors built. Bosch magneto is used for ignition.

Clutch, Transmission and Drive

From the motor the power is transmitted through a very simple dry disc clutch. The drive from the clutch is by means of a propeller shaft with universal joints to the transmission, which is located in the center of the frame suspended on two cross girders set high to allow a 24 in. clearance.

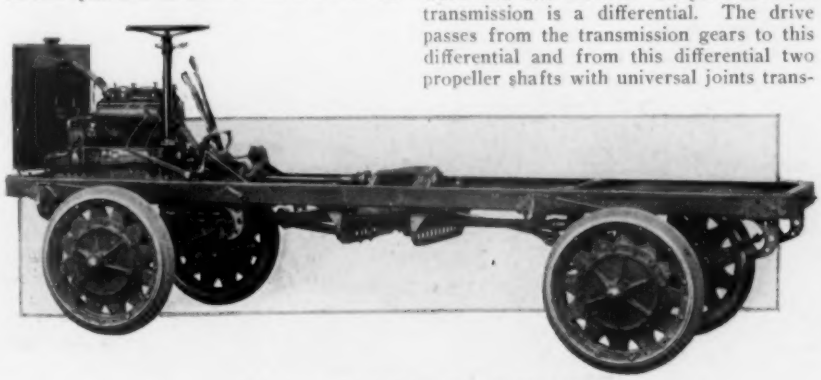
The transmission has four speeds forward and one reverse. Coupled with the transmission is a differential. The drive passes from the transmission gears to this differential and from this differential two propeller shafts with universal joints transmit the power to the two differentials, one located on the front and the other on the rear axle. From these differentials the power is transmitted by means of shafts to each of the four wheels. There being a steering knuckle for each wheel, it follows that the final drive shafts have a universal joint. On the extreme end of each shaft is attached a spur pinion, and their spur pinion engages with an internal gear within the body of the wheel, thus applying the power to the wheel near to the outside of the rim. The internal gear of the wheel and the pinion driving the wheel are housed in a manner to exclude all foreign matter. This housing, at the same time, serves as a flange upon which the brakes bind.

The four wheels are exactly alike and interchangeable. The four drive axles,



Jeffery Four-Wheel Drive

Wheels are driven through an internal gear from the universal joint shown



Side View of Jeffery Truck Chassis

Four-cylinder motor, 3¾ x 5¼ in. on right side. Left-side drive and center control. Capacity 3000 lbs. Wheels, axles and brakes are interchangeable

with their universals, are alike; the four brakes alike; the two axles alike; the three differentials alike and the propeller shafts alike. The even distribution of power makes possible this duplication of parts, which it is claimed, simplifies repairs and maintenance of the car. The road clearance beneath the axles is 15¼ in. The carburetor being set at a high level, this car will travel in water two feet deep. By means of the Wayne differential, which automatically drives the wheel which has traction coupled with the four-wheel drive, this truck, the manufacturers claim, can be propelled so long as there is any traction whatever.

The truck is of 120 in. wheelbase, yet it will turn in a circle of 44 ft. diameter. This is accomplished through the four-wheel steer. There are four large ample brakes on the wheels, and the truck loaded to its full capacity and driven at a maximum speed, can be stopped in a distance of 11 ft. by means of these brakes.

The frame is of pressed steel, heat treated; the axles of vanadium steel; the gears of nickel steel and the bearings of the annular ball bearing type throughout, with the exception of the wheels on which are used roller bearings of nickel steel.

KNOX COMMERCIAL CARS FOR 1914

The Knox Automobile Company, of Springfield, Mass., does not contemplate making any changes in its two, three and four-ton trucks for next season, with the exception of a few minor details, changed more for better manufacturing rather than because of any necessity.

New Type Martin Tractor

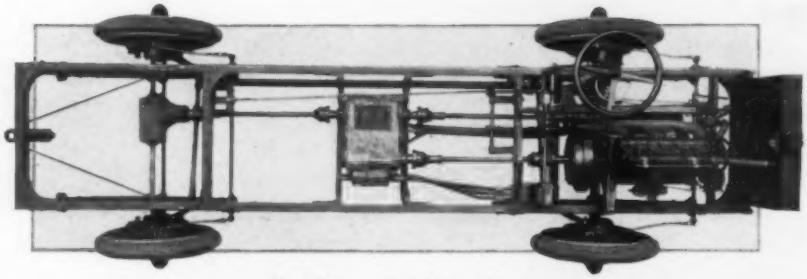
On the Martin tractor, however, several important improvements have been made, as follows:

The stabilizing bar, which runs across the rear of the tractor and whose function is to keep the vehicle steady and prevent oscillation on the road, has been made of larger dimensions and of hollow tubing and effectually stops all swaying of the vehicle under strain.

The bearings on the ends of the jackshafts have been redesigned to make it easier to gain access to vital parts by removal of the jackshafts themselves, etc.

Changes have also been made in the brakes, giving larger wearing surface and putting the running brake drums on the outside of the sprockets rather than on the inside, thus bringing the sprockets nearer to the out board bearings.

The driver's seat has also been moved further forward, permitting greater room between the back of the seat and the king pin, so that ladder trucks, etc., with large forward overhang can be swung without striking the seat.

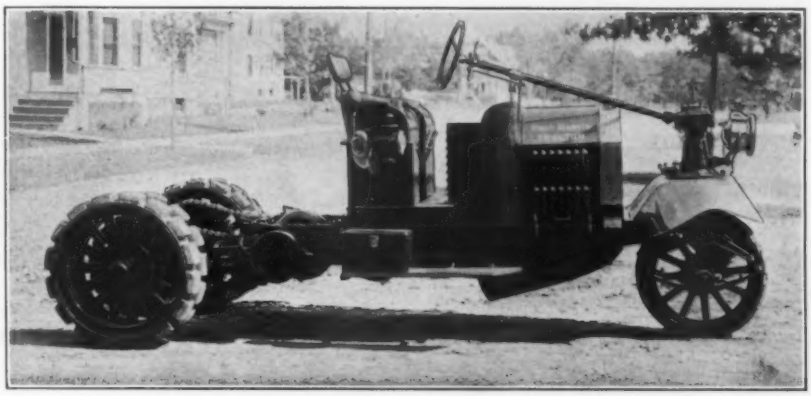


Top View of Jeffery Truck

Quadruple drive, steer and brake. Power goes from clutch to transmission, then fore and aft, by means of the shafts shown and universal joints and internal gears to wheels

NEW MODEL F ADAMS CAR WITH DUMPING BODY

This new model brought out by the Adams Brothers Company, Findlay, O., is outfitted with a bottom dumping body, somewhat of a novelty in commercial car construction. The demand among contractors for a car which can be equipped with convertible bodies was more or less instrumental in bringing out this model. The contractor may use the truck part of the equipment with the dumping body, and then if he wants to use the truck for hauling concrete blocks, brick or other materials, the dumping body can be easily removed and the platform stake body substituted.



Knox 1914 Model of the Martin Tractor

Showing arrangement of body further forward on the chassis, curved metal dash and the placing of service brake drums outside the sprockets on the jack shafts. This Tractor model is known as Type B. It also has a heavier tubular stabilizing bar, which completely prevents rocking of the tractor.

Model F Adams Two-Ton Truck

Fitted with dumping body, which is operated by driver, from seat. This body can be quickly removed and platform body substituted

The dumping body has a capacity of 2 tons, or a little over 1½ yards of crushed stone. The load is discharged by simply throwing a hand lever, which can be done by the driver from the seat. The specifications for this model Adams are the same as the reguar Model E, two ton chassis, with the exception of the wheelbase, which is 115 in.

The motor has four vertical cylinders 3⅞ in. bore and 5 in. stroke, cast en-bloc, rated at 30 h. p. Water cooling is used and the radiator is situated back of the motor, being of the vertical tube type and provided with filling caps, one on either side. It is spring supported. Ignition is high tension, dual type.

The clutch is of the multiple disc type, and is so designed, it is said, that even if it were dropped in suddenly, it would

pick up its load gradually without any strain on the driving parts. The transmission is of the selective type, giving three speeds forward and one reverse, with direct drive on third. It is located in the center of the car, mounted on cross members, and connected with the clutch by a driving shaft and universal joints. The shafts are of special alloy steel.

NEW LANDSHAFT FIFTEEN HUNDRED POUND TRUCK

WILLIAM LANDSHAFT & SONS, Chicago, Ill., have made another addition in the shape of a new 1500-lb. capacity truck, which will be known as Model C.

The Motor

The motor is four-cylinder, four-cycle, L-head type, with cylinders cast en bloc, and has a 3-in. bore and 4½-in. stroke, with valves enclosed. The crankshaft is drop forged of special high grade steel. The three crankshaft bearings are extra large and well proportioned. The oil pump is of the plunger type and is operated by a cam driven from worm gear from the cam shaft. This pump forces the oil through a sight feed on the dash. Only new oil is forced through the sight feed. The constant supply of new oil can be easily regulated by an adjusting nut located on the crankcase. The oil may be regulated from one drop to every fifty revolutions of the motor, to as many drops as may be desired, which absolutely assures lubrication, without the motor smoking. The ignition is by Remy magneto and carburetor is a Schebler with hot air jacket. The cooling is by the thermo syphon system, with a honeycomb radiator mounted on springs. The motor is three point suspended.

The transmission is the planetary type, in unit with the jackshaft, having two speeds forward and one reverse, the drive shaft from motor to jackshaft having two universal joints. The axles are 1½ in. x 2 in. rectangular front and 1¾ in. square in the rear fitted with ball bearings.

The wheels have twelve 1¾-in. spokes. Tires are 34 x 2½ in. in front and 36 x 2½ in. in rear and are the demountable type. The front springs are 40 x 2 in. semi-elliptic, and the rear are 44 x 2 in. platform. The brakes are 13 x 2 in. external contracting on the rear wheels. The frame is pressed steel well trussed. The wheelbase is 117 in. The price is $1075, with open express body, other bodies being built to order; prices are given on application. The loading space behind seat is 84 x 43 in. A sliding gear transmission instead of the planetary can be furnished at $40 extra.

Landshaft Model C
This is a four-cylinder, 3 x 4½ in. job, with a 117 in. wheelbase. With this body it sells at $1150; with standard open express body, at $1075

New Stegeman Light Truck
This is a fifteen hundred pound cushion-tired job

NEW STEGEMAN THREE-QUARTER TON TRUCK

A 1500-lb. delivery wagon is the most recent addition to the line of the Stegeman Motor Car Company, Milwaukee, Wis. This car has high-grade quality of construction and beauty of design. This new model is built for the quick delivery service required of this class of machines and is designed to stand severe knocking around.

This new model has a powerful motor, 3¾-in. bore by 5¼-in. stroke, rated at 30 h. p. A governor is used on the motor limiting the speed of the car to 20 m. p. h., yet giving ample power for heavy going or steep hills. The frame is of pressed nickel steel channel 3-16 in. thick, 2 in. wide and 4½ in. deep. A system of bronze bushings, which localizes wear and avoids the replacement of spring leaves, shackles, etc., is employed throughout the chassis. All springs are of the semi-elliptic type. They are long and of moderate arc and especially sensitive to action. They are made of mangano-silicon steel tempered in oil. The front springs are 2¼ in. wide by 48 in. long and the rear 2¼ in. wide by 54 in. long.

Realizing that this class of delivery wagon is sometimes placed in the hands of careless drivers, the control has been made absolutely "fool proof." There are no throttle or spark levers on the steering column. The spark is automatically timed by a governor on the magneto, and is advanced and retarded according to the speed of the motor. This gives accurate timing and prevents injury to the motor by preventing pre-ignition, etc. The set throttle lever is mounted on the dash and a foot accelerator is provided for driving.

Both clutch and service brake are operated by one pedal. This method provides a very effective braking system and prevents the possibility of throwing on the brakes when the clutch is in engagement. An emergency brake is also provided at the left of the driver. Left side steer is used.

Tire Maker Compares Foreign and American Mileage Records

Reasons for the Shorter Mileages Obtained Under Average Conditions in the United States

THE committee representing the Commercial Car Section of the Automobile Chamber of Commerce, in studying the various methods by which the cost of operation of motor trucks in the United States might be reduced, recently made a comparison of the tire mileages obtained in Europe and those obtained in the United States. After looking over the foreign field, the committee was inclined to the belief that the longer mileages abroad were due largely, if not wholly, to the differences in the shape of the tire sections.

With a view to securing the opinion of the American tire manufacturers on this point, Windsor T. White, President of The White Company, and Chairman of the Committee, requested S. V. Norton, Sales Manager of the Truck Tire Department of the B. F. Goodrich Company, to appear before this committee and tell them how the American tire manufacturers accounted for this difference. Mr. Norton accepted the invitation, and, at a meeting of the committee held in Cleveland recently, he placed before them a large amount of data, which he had gathered from authoritative sources, bearing on this subject.

"In my judgment," said Mr. Norton, "the longer tire mileages abroad are not due to the difference in the sectional shape of the tires." In confirmation of his opinion he called attention to the effects of American conditions on tire mileages as over against European conditions, with respect to

(1) Roads on which Motor Trucks are Operated;

(2) Usage, Whether Careful or Careless;

(3) Size of Tires, Whether Adequate or Inadequate.

Next, he pointed out some of the problems in the way of increasing American tire mileages, and, finally, offered some suggestions for future action on the part of truck manufacturers and users with a view to increasing American mileages and thus reducing the operating costs.

Taking up first the matter of more favorable road conditions abroad, Mr. Norton quoted a letter from Arthur E. A. M. Turner, a prominent authority on motor trucks in England, saying: "Now, as to what roads the solid tires are used on. Well, I suppose, with the exception of the main roads in France, the English roads are the best in the world. One thing that favors this is that it is a small country. In London itself the majority of the street surfaces are composed of wood blocks, which wear very evenly for about ten years. In the suburbs, say from eight to ten miles distant, you get the main roads with macadam surfaces of rolled tarred granite chippings, which are mostly very good, and if properly tarred are almost dustless."

Mr. Norton quoted further from Mr. Turner: "Everyone I have heard speak on the subject from personal knowledge says that we are a great deal better off in the matter of roads. P. D. Wagoner and G. W. Wesley, of the General Vehicle Company, whom I met across here last May, said the worst roads here were like billiard tables in comparison to theirs."

From the London branch of the B. F. Goodrich Company, Mr. Norton quoted part of a letter, as follows: "Truck tire mileages in this country vary enormously in relation to the nature and severity of the service, and too much importance cannot be attached to the exceptional tire records. For example, on the London omnibus, 30,000 miles is not an exceptional figure, and is attained in dozens of instances, and not always from the best makes of tires. At the recent Commercial Show at Olympia, London, a firm of English tire manufacturers was showing about forty tires which had done over 30,000 miles each on London omnibuses, but there is no doubt that all these came from vehicles which had been plying in the central parts of London, where the surfaces are wood pavement or asphalt, and severe gradients are almost unknown. Probably the mileages on similar vehicles penetrating the suburban districts of London will not average more than half this amount. This fact is well understood by private users, and undue importance should not be attached to the publication of these highly advertised figures."

Dr. Harold Pender, Director of the Research Division of the Massachusetts Institution of Technology, while in England recently, made an investigation of solid tire mileages obtained in the country, and made a statement to the effect that the average life of a tire on ordinary roads outside of London is about 8000 miles. He suggested that the mileages on tires which are exceedingly high evidently apply to London only, where the paving is chiefly asphalt or wooden blocks, and where they run under very favorable conditions. Thus it appeared to him that the European tires had the initial advantage of being used on very much smoother roads.

"Next," said Mr. Norton, "the human element enters into the problem as an important factor." He showed the comparative effects of careful and careless usage of trucks on tire mileages. He quoted from European authorities, showing that foreign trucks are operated by men of more than average intelligence and experience. "In addition to this," said he, "they are prompted to take the best care possible of their tires by the inducement of bonuses which are paid to the drivers at the end of certain periods, if they have handled their machines carefully, as shown in the half-yearly and yearly overhauls." Mr. Norton spoke of the "merit system" employed by Armour & Company, of Chicago. "Each chauffeur," said he, "is charged with demerit marks on any occasion that he may bring in his truck in other than perfect condition. This, of course, applies also to tire equipment. Prizes are awarded drivers with the least demerit marks at the end of a certain period, which is two or three months. The result of the system is that Armour & Company have a most perfect service. The drivers are careful to prevent any unnecessary injuries to their tires, and endeavor to pick the best road surfaces, and, as a result, Armour & Company are getting a higher average mileage than any other company in Chicago doing heavy hauling."

Several instances were cited of trucks used in cities where the pavements were below the average in condition, where the drivers have secured mileages of from 10,000 to 13,000, as a result of personal care in the handling of their machines. He also made reference to specific instances in which tires have been quickly ruined by careless treatment of the drivers, both in well paved and poorly paved cities.

In the matter of overloading, the manufacturers of the committee agreed with Mr. Norton that this abuse is the hardest to control. Moreover, they decried the American tendency to overspeed, as contrasted with the impossibility of overspeeding in foreign countries, by reason of the strict observance of speed laws in England and continental cities. The Bulletins of the Research Division of the Massachusetts Institute of Technology were referred to in connection with the abuses which tend to shorten American tire mileages, especially on gasoline trucks, as compared with electric vehicles.

"In regard to the comparative effects of adequate and inadequate tire equipment," Mr. Norton said, "truck manufacturers themselves are very frequently to blame for not putting on large enough

tires as original equipment when the trucks leave their factories. In addition to this," he continued, "most manufacturers are willing to accept orders for chasses only, allowing their customers to apply bodies built to meet their own requirements, regardless of their weight and size. This enables the user to apply loads which are far in excess of those the manufacturer intended the tires to carry." The manufacturers agreed with Mr. Norton that frequently in giving demonstrations, their salesmen were inclined to overload their trucks considerably, with a view to showing the extraordinary efficiency of their machines in actual service.

"It is the practice of the B. F. Goodrich Company," said Mr. Norton, "whenever possible, in making renewals of tires which have been worn out in service, to apply the next size larger tire, in view of the assurance which may be given to the customer that the additional mileage he will obtain in so doing will more than offset the increased cost for larger equipment." He cited many examples of this practice of his company throughout the country.

"In the next division of my report," he continued, "I shall indicate some of the problems in the way of increasing American tire mileages. There is an almost total lack of adequate records for keeping accurate track of mileages obtained in this country, as well as of other costs of operation. Moreover, in certain lines of business it might be distinctly economical for the owner of the truck to deliberately wear out his tires in intensive service, with a view to making high profits upon large and rapid deliveries." The committee agreed with him that this was a legitimate use to which motor trucks could be put, but felt that in most cases economy of upkeep was a more important factor than intensive service. "Among other problems," said Mr. Norton, "may be mentioned the difference in the practice of manufacturers in respect to the road gearing of their machines, as well as the different ratings, which permit the user to apply bodies of different sizes and overhangs, all of which have a very distinct bearing on ultimate tire mileage. Still another difficulty," Mr. Norton pointed out, "is that of obtaining definite, concerted action on the part of truck manufacturers in respect to controlling the size and weight of the body which you allow your customers to apply to your trucks."

"Finally," said Mr. Norton, " I should like to offer several suggestions which, if adopted, would tend to increase the mileages obtained on American motor trucks, and thereby considerably reduce their cost of maintenance. For one thing, I believe that the motor truck manufacturers should maintain schools for the training of drivers for their trucks and should insist on having only experienced and careful men handle their machines. This practice would reduce to a minimum the expensive factor in the human element due to the employment of ignorant or careless drivers. Next," he suggested, "all manufacturers should install a periodic inspection of trucks in service, if this is not already done, and, during such inspection, due attention should be given to the matter of loading and operating the trucks whose expense of maintenance seems to be unusually high. On the part of motor truck owners, let me urge the use of uniform records for cost of operation, such, for instance, as are furnished by the B. F. Goodrich Company or those devised by the Research Division of the Massachusetts Institute of Technology." In closing, Mr. Norton said that the use of steel wheels would tend to increase the mileages received from tires, owing to their freedom from contraction and expansion, and he referred to the extent to which this practice had increased abroad, as shown at the recent Motor Truck Show in London, where more than half the trucks shown were equipped with steel wheels.

DETROIT POLICE DEPARTMENT USES COMMERCE TRUCK

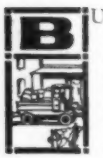
Thousands of dollars have been saved to the city of Detroit by a purchase recently made by Police Commissioner Gillespie, and the saving was accomplished through the use of a one-half-ton truck especially constructed for the Police Department by the Commerce Motor Car Company, of Detroit. With this little truck the total mileage of the police patrols of the City of Detroit will be reduced from about 125,000 miles for the coming year to 80,000 miles, with a consequent saving in expense. Big police patrols for the city of Detroit are expensive and cost the city in the neighborhood of $5000 each. With these large patrols small errands have been done in the past. The patrols were used for transferring property taken from prisoners at outside stations to headquarters. This property may have consisted of only a flask of whiskey, yet it had to be recorded at headquarters, and the patrol and two men took it there. Officers carried reports from each precinct station twice a day to headquarters. The mileage of the big patrols of 1911 was 80,000 and in 1912 it jumped to 115,000. The attention of the Police Commissioner to the matter came through the entry into his office of a policeman who stepped from a $5000 automobile patrol and asked for a small pad of report blanks for a precinct station at some distance out. The patrol carried its usual equipment, driver and two officers. The Police Commissioner expressed his surprise, immediately became busy, purchased a smaller machine and manned it with one driver for the errand work. He selected the Commerce, of which there are three score running now in Detroit, and this smaller car with the one driver has been doing a wonderful amount of work. It is said now that several more are to be added. Orders were issued that none of the large patrols were to leave the stations without the orders of the signal officers, and patrol men now remain in the stations instead of accompanying the large patrols when reports are carried to headquarters twice daily. With Detroit the Commerce truck has proved not only an immense money maker in the saving of wear and tear on the large police patrols but it has also proved a wonderful saver of salaries paid to the officers for time wasted while pleasure riding in the larger cars.

Commerce Truck Used by Detroit Police

This is a one-half ton job, used for errand work by the Detroit Police Department. Before the installation of this truck, the work had to be done by the large trucks

How Shall the Purchaser of Commercial Cars Be Financed?*

Raising Funds for Motorizing Traffic a Problem



BUSINESS men of the United States have already invested $133,000,000 in 60,000 motor trucks. These trucks displace at five animals each about 30,000 of our 25,000,000 mules and horses, or under 2 per cent. Assuming that 75 per cent. of the horses are on farms, and not now affected by the truck, the possible future market is still about 1,000,000 motor trucks, valued at $1,000,000,000 at least. How shall we finance an investment of such magnitude?

"Discarding these figures as excessive, let us be conservative and assume that we shall need in the next decade one truck to every fifty horses, or 500,000 trucks, valued with necessary garage equipment at the low average of $2050 each. Here is $1,250,000,000. Spread this now almost imperative investment over a period of ten years and you have $125,000,000 per year to be secured from some source.

"Assuming the average life of the work horse in cities and towns to be six years (it is given as four years in some large cities), the mortality of the 6,250,000 horses in commercial service would be 1,041,666 animals annually. Giving these the low valuation of $125 each, we have the $130,203,313 referred to. If business can survive this large yearly contribution to fertilizer plants, surely a way can be found to raise the funds necessary to install machinery which has double the (city) life and treble the efficiency of the horse.

"Digressing for a moment, let me say that to-day the motor truck is practically a necessity for the progressive firm. Economies are no longer possible with horse service as compared with motor service.

"Motor truck efficiency contemplates much more than the substitution of perhaps six five-ton trucks for sixteen three-horse wagons. It contemplates adaptability not only in rated load capacities, but in type of machines used. Then, there is the matter of a suitable garage on as cheap land as circumstances will permit. Furthermore, there is the matter of scientific routing—the advisability of combining, for example, five horse wagon routes into three motor truck routes and so on. All these things, while making for greater economy and efficiency, also enter into the cost of motorizing a delivery system.

"Some firms have as much as $150,000 represented in stable and wagon yards alone, and by building a garage on cheaper ground rents, are able to release real estate sufficient to make the turnover from horses to motors not only without increased cost, but at a profit, due to the fact that horse equipment requires from 300 to 500 per cent. more space than equivalent motor vehicle equipment.

"'How shall the motor truck be financed?' How shall we convert each year horse equipment and its allied investments into $125,000,000 worth of commercial motor vehicles? The three principal factors involved are (1) the motor truck manufacturer. (2) The capitalist. (3) The banker. I shall endeavor to show which of the three is best fitted to aid the buyer in supplying this new transportation necessity.

"The financing of individual trade operating companies by motor truck manufacturers whose product is to be utilized has been tried without success, and so has the co-operative delivery system organized by a subsidiary created for the purpose. Few companies can be both bankers and manufacturers successfully, and I think this fact eliminates the first of the trio.

"I can see where a capitalist might organize a motor trucking company to haul all the ore from a certain mining center to the railroad and make money out of it. As for the individual who will organize and successfully operate a co-operative delivery service for five big competing dry goods stores, he will be a financier, a diplomat, and an operating genius rolled in one.

"That highly desirable plan of having two co-operative motor delivery wagons with full loads call at an apartment house instead of ten horse wagons one-tenth loaded may materialize, and I hope it will, but few stores are content to lose the individuality of their delivery service even if they could bury their jealousies long enough to become parties to the plan. Looking at the matter broadly, it would appear to be a little early yet for the capitalist to promote improved road transportation on this basis.

"There remains then, the final court of appeal—the banker; or more properly, the bank. Why shouldn't the firm which desires to motorize and has not sufficient working capital to do so consult with its nearest and best business adviser? When a man owning a large machine shop needs to expand he goes to the bank for assistance in financing a growing business. The bank may look over his books, and then decide for or against the proposition. If the plant shows net earnings in keeping with increased business it will be regarded as a good risk up to a certain point.

"Why can't this general principle of approved credit be extended to the motor truck buyer? I can see nothing irregular about it, and it seems to me the bank is the logical source of credit. The overzealous merchant who proposes to motorize in such haste that he cannot liquidate existing horse equipment to advantage should most properly be cautioned, but on the other hand, the man who sees his business slipping away from him because of competition strengthened by improved delivery service should not be wholly ignored when he asks for credit which will enable him to motorize progressively and on a sound basis. If he can present figures to show that $50,000 will enable him to convert his present delivery assets into an up-to-date electric delivery service in two years' time at a saving of two and a half cents per package delivered, thus earning 17½ per cent. on the investment, exclusive of the increased business secured, should he not receive favorable consideration? I think he should and I believe he will.

"In justice to the banks, it must be conceded that in the past they have not had any great cause to favorably regard the manufacturing end of the motor truck business as a field for investment. The motor truck, as a whole, inherited much that was undesirable from the automobile particularly with respect to plant management and injudicious selling, but the industry is now on a sound demand basis and the growing market for a given product is the chief desideratum. There are a sufficient number of motor truck makers on a sound producing and selling basis to-day to warrant a closer study of how best to aid the deserving but needy buyer to utilize their product. The need is not local, but national and involves all lines of business.

"Either we must lay down foodstuffs at the corner market at a cost which will enable the laborer at $1.50 per day to live or we must increase his wages accordingly, and if we can't do the first with animal haulage, we must employ the self-propelled vehicle. In the end, what difference does it make whether the banker extends credit to the grocer to enable him to motorize and so secure and deliver his goods at less net cost, or loans money to the local manufacturer who is face to face with increased production costs because his employees cannot exist on present wages in view of the increasing cost of the bare necessities of life?

"That is an extreme view to take, perhaps, but highway transportation in its ramifications offers to-day the one logical opportunity for national retrenchment. The possible economics are staggering, as witness the $150,000,000 expended annually for trucking goods with horses in New York City alone. * * *

"Doubtless they will some day evolve a system of equipment trust securities, and we shall see motor trucks as well as railroad cars bearing the small steel plates which have made possible so much new rolling stock as well as dividends for the sponsors.

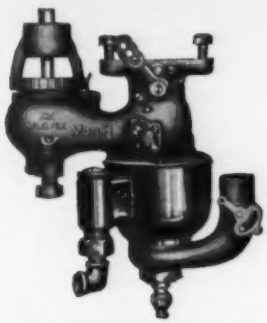
"I am not advocating anything so visionary—am frank to say I can give no idea how such a procedure would work out—but there are possibilities in even this passing suggestion. The ramifications of my subject are endless. I shall feel well repaid if this article should cause one thinking financier to look at the situation from the standpoint of the motor truck buyer."

*Extracts from article by P. D. Wagoner, of the General Vehicle Company, of Long Island City, in "Business America."

NEW SCHEBLER CARBURETOR

This new Schebler creation is designated as Model R, and is built for use on four-cylinder motors. It is a single jet raised needle type of carburetor, automatic in action. The air valve controls the lift of the needle and automatically proportions the amount of gasoline and air at all speeds.

An adjustment is provided for low speed; as the speed of the motor increases, the air valve opens, raising the gasoline needle, thus automatically increasing the amount of fuel. There are but two adjustments—the low speed needle adjustment, which is made by turning the air valve cap, and an adjustment on the air valve spring for changing its tension. The new carburetor has an eccentric which acts on the needle valve, intended to be operated either from the steering column or from the dash, to insure easy starting, as by raising the needle from the seat an extremely rich mixture is furnished for starting, and for heating up the motor in cold weather. A choker in the air bend is also furnished. This carburetor is made in four sizes: 1 in., 1¼ in., 1½ in. and 1¾ in. The price ranges from $18.75 to $26.25. Wheeler & Schebler, Indianapolis, Ind., are the manufacturers.



The Schebler Carburetor Model R

A NEW SHIFT IN UNIVERSAL-JOINT CONSTRUCTION

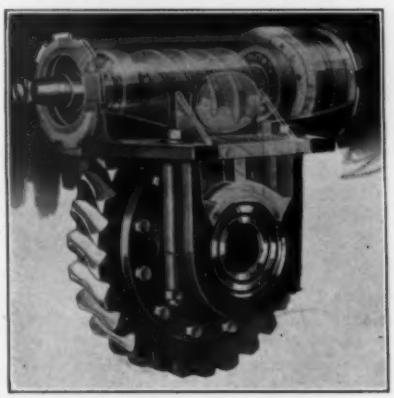
A great advance in the manufacture of parts has been made by the Feeny-Hurd Company, of Muncie, Ind., in the "Feeny" Universal Joint. This joint has been taken up by many of the leading pleasure and commercial cars, since its introduction to the automobile world at the last Chicago Show.

The "Feeny" Joint, by its unique construction, allows the covering of all working parts by a rigid housing, which has no boot or moving cover of any description. This housing is integral with the joint members; in fact, it serves the purpose of housing the lubricant, and at the same time holds the three essential parts of the universal joint together. No grease or lubricant can possibly seep from the housing. The three essential parts of the universal joint held together by this housing hinge by means of radial keys traversing radial key ways. This arrangement allows of large bearing surfaces. From the fact that these bearing hinges are flat, are hardened and ground to a perfect fit, the wearing proclivity of the joint is reduced to a minimum.

A feature is the fact that the peculiar construction of the parts places a large percent of the metal—which, by the way, is drop-forged—at that point where strain is greatest; in fact it would seem utterly impossible for any shaft, which could be attached to the joint, to break or spring it in the least. The radial keys fit perfectly into the radial key ways, and to break the joint it would mean that the key would have to shear off, as the fit of the parts makes impossible the strain of leverage.

In the cut it will be seen that the one joint is in position, while beneath it a joint with the case removed to allow of an understanding of its inside working parts.

The Feeny Universal Joint



The Sheldon Worm Drive

As seen by this illustration, the worm is mounted on two imported annular bearings, while the end thrust is taken with a heavy duty imported double thrust bearing.

SHELDON WORM-DRIVE AXLES

The Sheldon Axle Company, of Wilkes-Barre, Pa., calls attention to its worm driven axles, which are made in a number of sizes to fit all capacities of motor trucks.

Among the features of this Sheldon worm is its non-adjustability. The carrier must be machined accurately in order to assemble the worm and worm wheel. Once assembled, it is non-adjustable, and can be removed and replaced without disturbing its alignment. The very small amount of gradual wear increases its efficiency, but when worn enough to affect the efficiency of the axle, the worm and worm wheel can be replaced at a moderate cost.

The worm is mounted on two imported annular bearings, while the end thrust is taken with a heavy duty imported double thrust bearing. The differential is made of alloy steel and of sufficient size to take care of all loads. The differential is mounted on double row annulars.

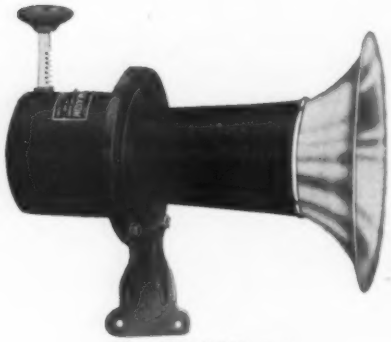
The axle housing is a one-piece steel casting of the very best grade of steel. In testing the strength of one of the one-ton housings it was supported on 37-in. centers and a fifty-ton weight placed on the center. Under this unusual weight it deflected 1-16 in., and upon the removal of the weight sprung back to its original position, proving the high elastic limit of the casting, which figures about 80,000 lbs. per sq. in. in the critical section. All Sheldon housings are of one-piece construction.

The Sheldon worm drive axle, being of the semi-floating type, special attention has been given to the axle shafts, owing to the combined bending and torsion to which they are subjected. The shafts are 2⅜ in. in diameter in the one-ton size at the critical point, and made of 3½-per cent. nickel steel, with a double heat treatment.

As is standard with all Sheldon equipments, both brakes are on the rear wheels, using 14-in. drums and 2½-in. wide bands.

A HAND-OPERATED KLAXON

The latest horn manufactured by the Lovell-McConnell Manufacturing Company, of Newark, N. J., is hand-operated. This new product is operated on the Klaxon principle of a vanadium steel diaphragm vibrated by a rotor or ratchet wheel. In the case of the electric Klaxon this ratchet wheel is rotated by means of an electric motor; in the Hand Klaxon by a train of gears that attain a high speed under pressure on the pushrod. The price of the Hand Klaxon is $10.



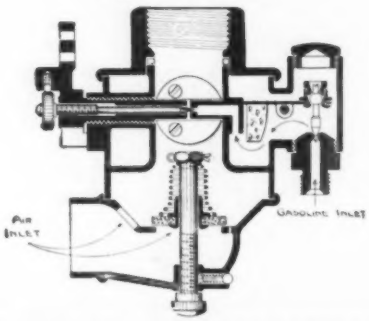
The Hand Klaxon

EIKER CARBURETOR BURNS KEROSENE

This carburetor is the product of the Eiker Carburetor Company, of 1790 Broadway, New York City. Instead of gasifying the fuel, this carburetor atomizes it into the finest possible atoms. At the same time, by using a predetermined amount of the exhaust heat through a jacket entirely surrounding the fuel bowl as well as the choke tube and throttle, the metal with which the gases come into contact is maintained at a uniform heat, approximately the same temperature as the cylinder walls, and prevents condensation.

A small amount of water (varying with the type of engine) is finely atomized at the same time through a spray nozzle, tangentially opposed to the kerosene spray nozzle in such a manner as to cause the oil and water to thoroughly intermingle with a powerful swirling motion, and in this fog-like condition the mixture is drawn into the cylinder.

The primary air is also heated by the connection of a flexible steel hose to a sleeve around the exhaust pipe. The auxiliary air valve is of the latest and most approved design, having double adjustment.



Sectional View of the Eiker Carburetor
Uses gasoline, kerosene and low-grade fuel

NEW TRUCK LAMPS

The Indiana Lamp Company, of Connersville, Ind., is manufacturing two styles of lamps designed especially for truck service. They are of the round pattern and are made of heavy steel stock, tin-coated before enameling, so that rusting is eliminated. While the tin-coated material is expensive, this company has decided to adopt it as standard, as the lamps do not rust, and the finish is not spoiled as in the case of the plain black steel.

New Indiana Truck Lamps
On the left is shown the side lamp, on the right is the tail lamp

1914 Model of Never-Skid

Warner Auto-Meter—Designed Especially for Pierce-Arrow Trucks

This instrument is manufactured by the Stewart-Warner Speedometer Corporation, of Chicago, and lists at $65. The face is 4¼ x 4¼ in.; base 5 x 5 in. It is fitted with a thirty-mile rotating speed dial, a 100,000-mile season odometer and a 1000-mile trip odometer with resetting device. The odometer numbers are black on white, the finish black enamel.

THE "NEVER-SKID," FOR DUAL TIRES, IMPROVED

The Never-Skid Manufacturing Company, of 210 W. Fiftieth Street, New York City, has greatly improved its anti-skid and traction device for dual tires. Drop forged steel crosspieces are used this year with chain connections in place of the solid links used last year.

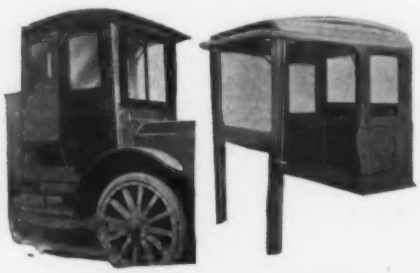
The new type has been thoroughly tried out under all conditions of hard roads and mud, with very satisfactory results. These chains are claimed not to injure the tires in any way.

THE STAR MOTOR TRUCK TOP

This top is the product of the Star Storm Front Company, of Troy, Ohio, and is designed especially for truck service. One of its features is that it can be used all year round. In summer time the storm front is removed.

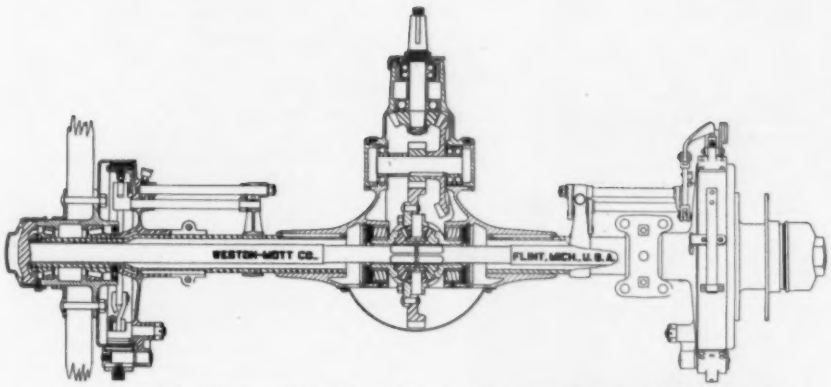
The main top is built with a view to lightness as well as strength and rigidity. It is practically a jointless top, the entire frame being constructed of continuous bows, as will be seen. At the bottom of the four upright posts are heavy iron feet or brackets which hold them firmly in position. These, in conjunction with the continuous bows, make a top that can not be racked through use. The frames for the side windows are made of hardwood and drop down into panels when not in use. They are held firmly in place by special window springs and are perfectly watertight at the bottom. The seat is made a good depth to admit a box or cushion.

The storm front is built entirely separate from the main top. It has a strongly constructed frame with automatic all-metal rollers at either side to carry the side curtains and a horizontal one at the top for the front curtain. The top and shield are trimmed or untrimmed, to suit the purchaser. The top is also supplied without the storm front if desired.



The Star Non-Racking Auto Truck Top With Removable Storm Front

The illustration on the left shows the top complete. On the right is shown the untrimmed top, with frame of storm front attached. The front can be removed or attached in five minutes.



Section of the Weston-Mott Rear Axle for One-Ton Cars With Solid Tires

NEW WESTON-MOTT AXLE FOR ELECTRIC OR GASOLINE TRUCKS

The Weston-Mott Company, of Flint, Mich., is offering a new axle which is made in two sizes—970L-D, for cars of 1500-lb. capacity, and 990L-D, for one-ton cars. The construction of the latter is identical to that of the smaller axle, but the design is proportionately heavier.

The available reductions range from 5:1 to 10:1. The bearings have been carefully selected to give the maximum of efficiency at the points where they are used, with the minimum cost. The first gear reduction is taken through a set of bevels, and then through a set of spur gears, which make a neat and compact rear unit. All parts are enclosed in an oil tight housing and the gears are practically noiseless.

The materials in this equipment have been carefully selected to give the maximum strength and the lightest possible weight for an axle unit for a vehicle of this capacity. All gears and shafts are made of alloy steel and the axle tubes are made of special materials to withstand the severe shocks which they are called upon to endure, on account of the solid tires used on commercial cars.

A NEW BRAKE LINING

The Standard Brake Lining Company, Gleasondale, Mass., is manufacturing a new line of brake lining, in which pure asbestos yarn is used reinforced with fine brass wires. The asbestos is very long fibre. The band is worn as a unit, with no filler threads. Prices range from $.40 a foot for ⅛ x 1-in. material to $2.20 a foot for ¼ x 4-in. material.

ELECTRICALLY WELDED VALVE WITH A CAST-IRON RIM

The extent to which specialization has been carried in the automobile industry is well illustrated in the manufacture of the valve shown herewith. The Electric Welding Products Company, of Cleveland, Ohio, manufacturers of the valve here illustrated, has been engaged in the manufacture of this part almost since the beginning of the industry. The firm's experience in making valves has proven that different materials are best adapted to the varying conditions which the different parts of the valve has to meet, and this valve is the development of study along this line.

The chief feature of this valve is the rim of cast iron, welded about the under side of the steel head by the oxy-acetylene process, thus forming an alloy of steel and cast iron which gives a hard seat that resists pitting. This seat is backed and strengthened by the steel head, thus giving the valve the advantages of a cast iron seat, combined with the strength and lightness of steel. In both the stem and head also it was found that different steels would give the best service.

The Cast-Iron Seat Valve
Split section of head, showing the cast-iron rim welded to the under side of the head

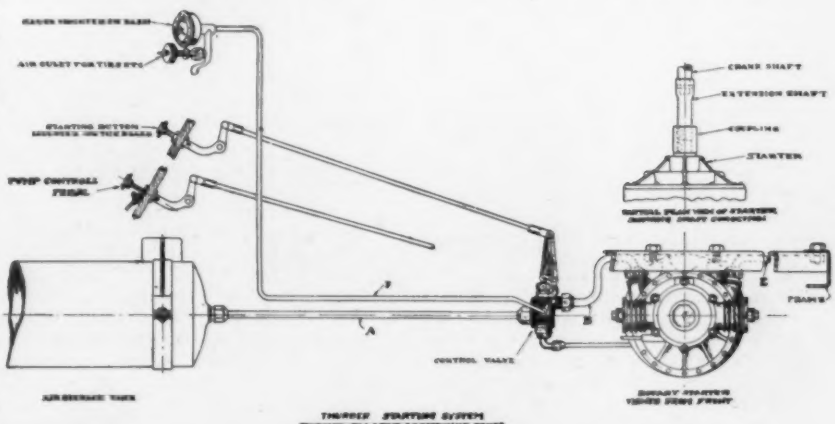
The Thurber Starter Unit
Showing pumps in front. These pumps furnish air for the tank

THE THURBER ROTARY STARTER

Compressed air is the medium used for operating the Thurber Starter. The chief advantages claimed for this device, which is manufactured by the Thurber Rotary Starter Company, Chene and Atwater Streets, Detroit, Mich., is that it is fool proof; is very simple in operation; contains few parts and uses very little air per start, thus eliminating constant replenishing of air in the compression tank.

The accompanying diagram illustrates the manner in which the starter is connected and operated. A double acting valve, which is controlled from the foot board by pedal, is used to release the air from the tank and also permits air to be pumped into the tank when the pressure is low. When the latter is the case a push on the pump control pedal places the pump in operation by means of a silent positive clutch. After the motor is running on its own power a clutch disengages the starter and it remains idle until again used. A tire inflation attachment is made in the dash plate valve, to permit attachment of a hose. The amount of pressure in the tank is indicated by a gage on the dashboard.

The starter can be easily installed on any car in a short time. It occupies little space and, due to its simplicity, requires practically no looking after.



The Thurber Starting System
Diagram showing manner in which starter is connected with compressed-air tank, control levers, etc.

EUREKA TRUCK JACK

This jack is designed for heavy truck service and has a lifting capacity of 8 tons. It is substantially built of malleable iron and steel, alumnized finish. This model embodies the original Eureka square base

Eureka Truck Jack, No. 5

design. The bearings are heavy, while long leverage lifts the load very easily. For quick adjustment the screw can be lifted up to the load with one hand and the top gear spun to the desired position with the other hand. The adjustment range is from 13 to 20 in. Its weight is 15 lbs. and the price, $5. This jack is manufactured by the Ashland Manufacturing Company, Ashland, Ohio.

IDEAL GRAVITY AND ATOMIZING PRIMERS

The Interstate Auto Accessory Company, 2124 E. Washington Street, Indianapolis, Ind., is manufacturing two types of primers adapted for any type of gasoline motors.

Model A, or atomizing primer, is operated by means of a handle, each stroke forcing the priming mixture into the intake manifold in the form of spray. This type sells for $5 complete, with tubing and connections.

The gravity primer, Model G, is practically the same as Model A, but without the atomizing feature. The feature of this primer lies in the screened end of the intake plug, which is screwed into the intake manifold. This screen is for the purpose of checking or holding back the flow of the priming mixture, not allowing it to run down into the carburetor before cranking or operating starter. This model lists at $3. The primers are furnished in either nickel-plate or polished brass.

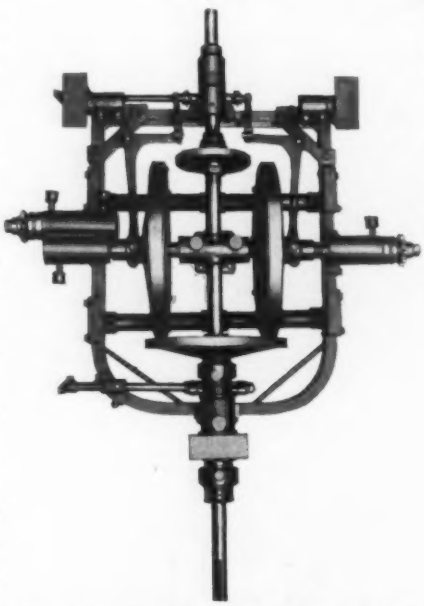
THE KRICK DOUBLE-FRICTION TRANSMISSION

The advantage claimed for this transmission, which is illustrated herewith, is that the two friction wheels bear equally against the driving disc and on each side of the driving shaft. The two friction wheels are always in a straight line contact with the driving disc, and the two friction wheel shafts are always in true alignment. The vehicle can be reversed only on a slow speed, as a small disc is used for the reverse speed.

The transmission is supported on three points and is flexibly connected with the motor by means of universal joints. This transmission is manufactured by the Krick Company, East 55th Street and Madison Avenue, Chicago, Ill.

Ideal Primers

On the left is shown the Ideal Gravity Primer, which lists at $3. The Atomizing Primer on the right lists at $5.



The Krick Double-Friction Transmission

LINDHE SHIM TO BE MADE PARTLY OF STEEL

The Lindhe Shim Company, of New York, has announced that it will soon be prepared to roll its "Laminated" shim material made up of Half .002 in. or of Half .003 in. Laminations of Brass and of Half Solid Steel, in thickness of 1-16 in. to 3-16 in. inclusive, on which it can quote considerably lower prices than on its material, or shims made therefrom, made up of Half Laminations and of Half Solid Brass, such as it has only produced heretofore.

NEW WOODWORTH NON-SKID PROTECTOR FOR PNEUMATIC-TIRED TRUCKS

The Leather Tire Goods Company, of Niagara Falls, N. Y., announces that it will shortly have ready a new Woodworth Tread designed especially for use on pneumatic tired trucks and delivery cars. This new Woodworth Tread will be held with the patented coil spring fastening which has been used on former Woodworth Treads, but the springs instead of passing through leather loops as in the past, will be attached directly to the main body of the tread. Each coil of the wire passes through a hole in the leather. In this way a very strong fastening is made. There being no cover on the spring, it cannot be chafed or torn off by curbstones or ruts and the covering being thin on the side, makes a neat appearance and does not appreciably increase the diameter of the tire. This tread will be made of extra heavy leather on the outside, reinforced by tire fabric and a second ply of leather on the middle part where the wear comes. The treads will be made with the regular flat-head studs for ordinary use and will also be made with pointed studs for use on ice and snow. Although heavy chrome material is used in these treads, they will sell at comparatively low prices. It is claimed for these that they will not only furnish a perfect anti-skid, but are practically puncture-proof and under average conditions will reduce the expense enough to more than pay their cost.

THE LITTLE GIANT TRUCK JACK

This jack is designed especially for truck use, and is one of the many types of jacks manufactured by the National Jack and Manufacturing Company, of 130-34 South Clinton Street, Chicago, Ill. It is rigidly yet simply constructed of high-grade malleable iron. The screw is of ¾-

Little Giant Jack

in. machined steel. For quick adjustment the screw can be raised to the desired height with one hand and pinion spun to position with the other. This jack is made in two sizes. No. 1—weight, 4 lbs.; adjustment, 9½ to 15 in., $1.50; and No. 2—weight, 4¼ lbs.; 11 to 18 in. adjustment, price $1.60. Capacity of each size is 1500 lbs.

THE CARTER PISTON VALVE MOTOR

The illustrations show a new type of four-cycle internal combustion motor, which is just being announced to the trade by the Model Gas Engine Works, of Peru, Ind. The novelty of this motor lies entirely in the valve mechanism, and from the top of the power piston down does not differ from the ordinary motor of the poppet valve type.

The advantages claimed for this new design are absence of noise, less vibration, quicker valve opening, no regrinding of valves; greater piston speed and greater economy.

Operation and Construction

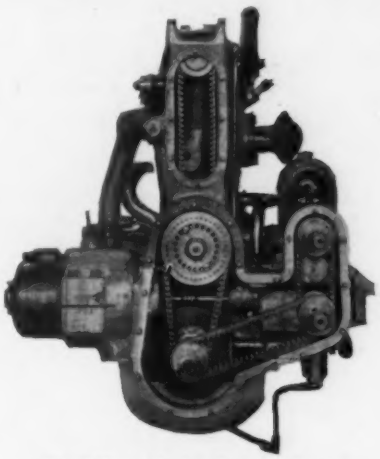
The motor has a bore of 3¾ in. and a stroke of 5¾ in. The cylinder is bored straight through as shown. The second piston is fitted into the head of the cylinder. This piston is fitted with three compression rings for holding the compression similar to the power piston. On the extension at the bottom of this piston are fitted two expanding rings A, A. These close the intake port C and exhaust port D and take the place of the poppet valve. The upper piston is operated by means of a cam shaft and cams E, E, F, similar to that of a poppet valve. The cam shaft is placed across the top of the cylinders, both the cylinders and the pistons being slotted to receive same.

The upper piston is provided with an ordinary piston pin G and roller H, the latter coming in contact with center cam F. The bridge I across the top of this piston has contact with the two outside cams E, E.

The outside cams are duplicates and are so ground that they are in contact with the bridge at all times, while the center cam F is in contact with the roller H at all times. These cams are so ground that each movement of the upper piston corresponds to that of the poppet valve.

Intake and exhaust ports extend entirely around the cylinder with the exception of a small space for the split of the expansion rings.

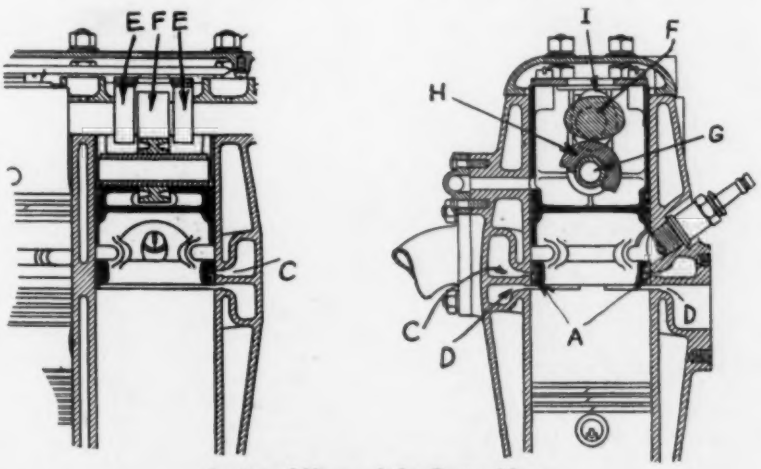
Drawing shows exhaust port open and piston on the exhaust stroke. At the beginning of the suction stroke, the cam F moves the upper piston down until the intake port C is open, which at the same time closes the exhaust port D. At the end of the intake stroke, and at the beginning of the compression stroke, the upper piston moves upward ¼ in. or only half of the entire stroke so that rings A, A, close both intake and exhaust ports. The piston remains in this position during the compression and working strokes. Near the end of the working stroke, the upper piston again moves ¼ in. upward until the exhaust port is fully opened as shown on drawing.



End View of the Carter Motor

Showing method of driving the cam shaft at the top of the cylinders by means of chains

The movement of the upper piston at no time exceeds ¼ in., while the total movement in either direction is ½ in., the complete movement taking place with two revolutions of the motor. In a motor with a 6-in. stroke, the working piston movement is exactly twenty-four times that of the upper piston.



Sectional Views of the Carter Motor

The illustration on the left shows a longitudinal view through the center of the cylinder. An end section is shown on the right. For explanation of reference letters, see text

Movement Affecting Wear on Cams and Power to Drive Cam Shafts

On the suction stroke, the vacuum is sufficient to draw the upper piston after it to its desired position, the cam serving as a stop or timing of the movements. On the return of the compression stroke, the compression tends to lift the upper piston, the cams again serving as a stop and holding it in right position.

Near the end of the working stroke, the pressure on the upper piston is sufficient to not only raise it for opening the exhaust port without assistance of the cams but exerts enough energy to materially relieve the cam shaft driving mechanism. On a six-cylinder motor, this energy is sufficient to drive the cam shaft so that the driving mechanism controls only.

It will be noticed that at no time the valves open against pressure so that whatever wear there is on the cams, is on the heel or part receding from the corresponding wearing surface.

Comparison of Two Motors

Poppet valve 3¾-in. cylinder with 1¾-in. valve ⅜-in. lift; piston valve 3¾-in. cylinder with port 5-32 in. wide going entirely around cylinder with the exception of ¾ in. for lap of ring.

	Poppet Valve.	Piston Valve.
Total area of valve	2.06 in.	1.75 in.
Time required from beginning to full opening of valve	102 deg.	62 deg.
Time required for ⅛ opening	58 deg.	21 deg.
Time required for ¼ opening	40 deg.	15 deg.
23 deg. poppet valve equal 1-32 in. lift. Area of opening	.17 in.	1.10 in.
34 deg. poppet valve equal 1-16 in. lift. Area of opening	.34 in.	1.43 in.
40 deg. poppet valve equal 3-32 in. lift. Area of opening	.51 in.	1.53 in.
58 deg. poppet valve equal 3.16 in. lift. Area of opening	1.03 in.	1.70 in.

By the above it will be seen that the last item shows the poppet valve one-half opening with but one-half of the area of the valve while piston valve opening is within .05 in. of full opening.

The number of degrees on balance wheel required to open the poppet valve 1-32 in. gives the piston valve opening approximately six and one-half times the area.

MOTOR TRUCK TOWS A LOCOMOTIVE

Many unique jobs fall almost daily to the lot of the two Locomobile trucks that are hauling material for a 4,500,000,000-gal. reservoir in Bridgeport, Conn., which when completed will double the water supply of the city, and prove adequate for any growth in population during the next one hundred years.

After hauling all the cement, machinery and supplies for the construction of this reservoir, besides 5 miles of 48-in. iron pipe, each section of which weighed 5 tons, these two trucks are now being

called upon for any emergency. Some of the work required of them was never before demanded of a truck.

The locomotive in the picture weighs 15 tons, the wagon on which it rests weighs 3 tons, and the truck itself was loaded with 5 tons of rock to give it traction. About 23 tons in all are being hauled by this truck. The locomotive was too big and heavy to put directly on the truck body, so a massive wagon had to be commissioned for the purpose.

In going up the steepest hills two Locomobile trucks were necessary to pull this load, but on the level road one truck was easily able to manage it. Had it not been for this method of hauling, it would have been necessary to use a team of about 20 horses to transport this locomotive over 3 miles from one end of the job to the other where it was needed. The trucks are in the service of the Bridgeport Hydraulic Company, which has placed an order for two more as a result of a 50 per cent. saving over horses formerly employed.

Truck Hauling Locomotive

Five-ton Locomobile truck hauling locomotive for the Bridgeport Hydraulic Company, in connection with the building of a 4,500,000,000 gallon reservoir in Bridgeport, Conn.

SOME GARFORD OPERATING COSTS

The Garford Company, of Elyria, O., has made a number of calculations based on actual observation of trucks in operation and has compiled two tables, one showing the cost of operating a Garford five-ton truck, and the other the cost of a three-ton truck.

In the fixed charges, garage expense is figured, which may be materially decreased if trucks are stored on owner's premises. Interest is charged on half of investment only, because through the depreciation charge annually, the investment is being written off. The depreciation of 20 per cent. per annum is undoubtedly too high, as with the replacement and maintenance it is hardly reasonable to suppose that the vehicle will be of no value at the end of five years. The figure has been placed at 20 per cent., however, in response to the demand of owners who wish to be on the safe side.

In the mileage charges the tire cost is actual, as the tire manufacturers furnish a guarantee for 10,000 miles, based on the odometer, which is sealed by the tire company. Gasoline is figured at the prevailing wholesale price. The mileage per gal. is based on actual experience, as is the oil consumption.

The maintenance charges are placed at an average for the five years. It is altogether unlikely that such a sum will be required the first or second year, but the cost may be correspondingly greater in the later years and the figures are therefore fixed to give an average correct annual charge. Should the mileage per day be either more or less, then the above mileage charges should be revised accordingly. The fixed charge and maintenance will not be materially affected.

Operating Costs—Garford Five-Ton Truck, Fifty Miles Daily

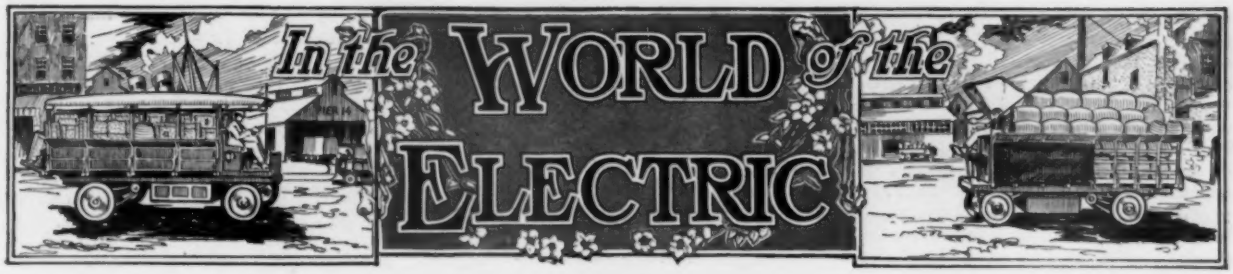
Price of chassis	$4500.00	
Price of body (average)	300.00	$4800.00
FIXED CHARGES		
Driver, 300 days @ $3.50	$1050.00	
Garaging @ $25 per month (average)	300.00	
Insurance, fire and liability	300.00	
Interest half of investment	120.00	
Depreciation, 20 per cent. (less tire $580)	844.00	
Painting and body repairs	75.00	$2689.00
Per day (50 miles)	8.96	
Per mile		.179
MILEAGE CHARGES		
Tires, 10,000 mile guarantee, per mile (580.00 per set)		.058
Gasoline @ 20c per gallon (5 miles to the gallon)		.04
Oil, @ 40c per gallon. (110 miles to the gallon)		.0036
Grease for gears, chains and grease cups		.002
MAINTENANCE CHARGE		
Repairs and replacements, including yearly overhaul, $400, on a 50 mile daily basis, per mile		.033
Total cost per mile		.3156
Total cost per day (50 miles)		15.78

Operating Costs—Garford Three-Ton Truck, Sixty Miles Daily

Price of chassis	$3500.00	
Price of body (average)	300.00	$3800.00
FIXED CHARGES		
Driver, 300 days @ $3.50	$1050.00	
Garaging, @ 25. per month (average)	300.00	
Insurance, fire and liability	275.00	
Interest half of investment	92.50	
Depreciation, 20 per cent. (less tires 450)	650.00	
Painting and body repairs	75.00	$2442.50
Per day (60 miles)	8.19	
Per mile		.135
MILEAGE CHARGES		
Tires 10,000 mile guarantee, per mile (450. per set)		.045
Gasoline @ 20c per gallon (5 miles to the gallon)		.04
Oil, @ 40c per gallon. (125 miles to the gallon)		.0032
Grease for gears, chains and grease cups		.002
MAINTENANCE CHARGE		
Repairs and replacements, including yearly overhaul, $400, on a 60 mile daily basis, per mile		.022
Total cost per mile		.2472
Total cost per day (60 miles)		14.832

USE FOR THE COMMERCIAL CAR IN THE WHEAT FIELDS OF CALIFORNIA

Using a five-ton truck and two or three trailers a Tulare County (Cal.) man made big money hauling grain to the railroads this season. The distances from the railroads varied from 12 to 25 miles and the roads were bad, being cut up by the heavy teams. By running his motor trains at a slow rate of speed, however, the roads were negotiated with loads of from ten to fourteen tons and three trips a day were made as a rule. As the wheat crop was unusually large this year, haulers were at a premium and horses were not plentiful enough to do all the work. The season's profit for less than two months' hauling netted this truck owner between $2500 and $3000. Of course this large profit meant lots of hard work. The third trip of the day was usually arranged so as to reach the railroad in the middle of the night. As soon as the warehouse was open in the morning the loaded truck and trailers would be emptied and a quick trip made to the grain field for the next load. About as much grain was handled by this outfit as could have been hauled by twelve four-horse teams. This seems like an exceptionally good opening for motor truck development.



Co-operation Between Electric-Vehicle Manufacturers and Central Stations*

FROM the viewpoint of the electric-vehicle manufacturer, the principal objects to be attained through co-operation are: the greater satisfaction among vehicle users, the reduction of their operating difficulties and the resulting increased sales, also the vehicle sales made possible by the good example established in the use of vehicle by the electric-service companies and because the service companies are in a position to advise the manufacturer of live prospects for the purchase of electric vehicles.

From the viewpoint of the electric-service company, the advantages to be realized are:

The promotion of the sale of electricity, thereby increasing revenue.

Improved operating conditions; *i. e.*, through obtaining a considerable "off-peak" charging business the central-station load-factor is improved, and the cost of production reduced.

Advertising; the service company feels that every electrically operated machine, be it an automobile or a buzz-saw, is an advertisement instrumental in bringing new customers to its lines.

Furthering the interests of the industrial and social progress of the communities in which the central-station company operates, for any improvement in civic welfare is ultimately reflected to the service company either in improved surroundings and æsthetic betterment, or in good, round dollars.

These are the chief reasons for co-operation, I believe, and are worthy of consideration. Fundamentally, there appears to be only one logical point of contact between the electric-service company and the electric-vehicle user, that is, the sale of current for charging. Is it not rather strange that the central-station companies are asked to render assistance in making the sale of a machine in which they are interested in only one item of its operation? The total annual cost of current for operating electric vehicles is seldom as high as ten per cent. of the total annual cost of owning and operating same. Can the central-station company, therefore, be expected to carry any great amount of the burden when it receives less than 10 per cent. of the money spent by the customer? Do the gasoline manufacturers lend any material assistance in the sale of gasoline cars? The gasoline manufacturers receive a far larger part of their total revenue from automobiles than do the electric-service companies? However, the electric-service companies are vitally interested and will co-operate with the vehicle manufacturers, thereby doing their part in advancing the electric-vehicle business to the mutual advantage of all concerned.

From the customer's viewpoint, the most conspicuous advantages accruing from the use of electric vehicles are: the ease, convenience and graceful luxury of the pleasure vehicle; the low operating expense, increased radius of operation and general foolproof construction of the truck, and of both the simplicity and freedom from breakdown, the absolute reliability and the avoidance of expensive attendance.

What can the service companies do to emphasize these characteristics or bring them more forcibly to the attention of the public?

First, by setting a good example. I understand that the Commonwealth Edison Company, of Chicago, has about one hundred electric trucks and is greatly pleased, not only with their performance in delivering material and for general transportation purposes, but equally well with the advertising gained by their use.

It often occurs that, in buying automobiles for electric-service company use, the choice of cars is left to the discretion of the purchasing agent, superintendents, or men not *directly* interested in the development and increased output of the company. Therefore, in selling electrics to central-station companies, the salesman should go to the manager and to the commercial department and to the men who are interested in advancing the welfare of the company and the city—not alone to the prospective operatives of the machine, who, perhaps, are more interested in the joy rides they may be anticipating or the noise they may be able to make with an open exhaust in a gasoline car. From the viewpoint of a driver, an electric may have advantages over gasoline cars or over horse-drawn vehicles, or it *may not*, but from the viewpoint of the man selling electricity and responsible for the advancement of the use of electricity, there is no alternative but the electric vehicle within its proper sphere of proven usefulness.

Second: there is the consideration of cost of operation. A great deal of comment (to use a mild term) has been made relative to the failure on the part of electric-service companies to lower their rates for current to charge electric vehicles. It has been urged that the excellent character of this load and the assumed inexpensiveness of producing such service have been ignored. There are probably some service companies charging rates out of proportion to the cost of this service; however, these are among a fast-declining minority, and they are gradually coming to a realization of the advantages of proper rates.

Advantages of Lower Charging Rates

Let us see what advantages may be derived from lower rates for charging. I find that the cost of practically every other commodity incidental to the vehicle industry is increasing in price—and, as an example of this, I would mention gasoline—while the cost of electricity has been lowered, not slightly, but, in some cases, as much as 50 per cent. In arguing for lower rates, it is cited that the vehicle-charging load is an "off-peak" load, and so makes no demand upon the central-station's capacity. This is largely true and deserves careful consideration, but, on the other hand, the service company's investment is not only in generating equipment, but also in lines and transformers, and the amount of such investment is often about equally divided between the generating plant and distributing system, including transformers, meters, etc. A garage requires just as much capacity in lines and transformers as any other load of similar size, and, in the case of private garages, the line requirements are often very much heavier than for other customers using a like quantity of current, notwithstanding the "off-peak" character of the load. Under such circumstances only a slight reduction in rates, if any, below those charged for other classes of service is justifiable.

A recent study of rates in a city of 325,000 inhabitants resulted in the establishment of a rate for charging of 3.8 cents per kilowatt-hour for the first 1000 kilowatt-hours, and reduced thereafter for larger consumptions. But, after all, what inducement does reduction in rates hold out to

*Paper read by E. L. Callahan, before the Electric Vehicle Association of America Fourth Annual Convention, at Chicago, October 27-28.

vehicle users? From various sources, including the classic work of the Massachusetts Institute of Technology, the Report of the School of Mines of Columbia University, and others, it is found that the cost of current for charging is very seldom as high as 10 per cent. of the total cost of operation, including proper interest and depreciation charges, and by proper depreciation charges I do not mean the exorbitant rates that may grow out of the mind of some warped economist, but the rates adopted by the most eminent authorities. The cost of current for charging being, therefore, less than 10 per cent. of the total cost of average trucking work, a 20 per cent. reduction in the price of current would mean less than a 2 per cent. reduction to the vehicle user in the cost of operation—truly an insignificant portion of the total expense.

Should Electric-Service Companies Help Sell Electric Cars?

It has often been suggested that electric-service companies should take an active part in the sale of electric vehicles, that they be displayed in showrooms, demonstrated by the selling force and advertised as are other current-consuming devices. It has often been suggested that central stations might well abandon the electric flatiron, with its "insignificant consumption" and turn their energies to the sale of electric vehicles, "using many times as much current." In discussion of this suggestion, I would say that the sale of a flatiron increases the company's annual revenue by almost three times the price of the iron, while the electric vehicle increases the annual gross by only about 6 per cent. of the selling price of the vehicle, that is, a flatiron selling for $3 will produce an annual revenue of $8, while an electric truck selling for $3000 results in an average annual revenue of only about $175. A flatiron produces a revenue equal to its original selling price in about 4½ months, while an average electric truck requires about 17 years and a pleasure vehicle about 25 years.

Another excellent reason for the service company not going into the automobile-selling business is that it is too foreign to the business of the company, requiring a separate organization and, not naturally, falling, in any wise, within the scope of the service company's functions. It may often occur that the central station has a garage for its own machines and may find it expedient to care for a few other vehicles; in that case, if the business is found profitable and works no hardship upon independent garages, it is certainly a commendable plan, but such a garage might equally well have been established and operated by any other interest. Likewise, if the service company finds that it can sell machines as a profitable business and without interfering with its patrons, all well and good, but the central station should not be asked to sell or provide garage facilities for electric vehicles with the expectation of a profitable return from the increased electric revenue.

It has often been urged that service companies might do extensive advertising and sales work in co-operation with the electric-vehicle manufacturers. A great many service companies are doing this on a large scale, but let us see how far they should go into this matter. A live central station interested in developing its business, to-day spends about two and one-half per cent. of its gross revenue in soliciting and advertising, or, it is found to be necessary in getting business and in advertising, to spend about twenty-five cents for each $1 of increased annual revenue. On the same basis the central station would be warranted in spending about $45 in obtaining an electric-vehicle customer. This includes the advertising and soliciting of unproductive prospects, as well as actual purchasers, and is based upon the revenue from a commercial vehicle. Considering the revenue from a pleasure vehicle, estimated at $80 per year, the permissible expense for advertising and soliciting becomes about $20. It is quite possible that when the desirable nature of this load is fully realized and the advertising incidental to the use of the electric vehicle and the general improvement in commercial and civic conditions is taken into consideration, that central-station companies might be warranted in spending as much as $60 for each commercial truck and $25 for each pleasure vehicle placed.

It should be remembered that part of this expense is necessary after the sale is made in arranging for contracts for service, purchase of charging equipment, etc. This probably seems like a small contribution when compared to the efforts made by the electric-vehicle manufacturers; but there is another side of this question. The actual amount of money which the electric-service company appears to be justified in spending would not be a fair measure of its efforts toward the larger sale of electric vehicles, for service companies have complete working organizations in close touch with every industry in their respective cities and are already doing business with practically every industry. The electric-service companies have the confidence of their customers, and their representatives are looked upon and referred to as authorities on related commercial and engineering questions. More, by far, can be accomplished in the advancement of the use of electric vehicles through these representatives than with the same expenditure of energy through any other channel available to the central station.

Suggestions to the Electric-Vehicle Manufacturers

I will undertake to outline a plan of co-operation in the form of a few well-meant suggestions addressed to the vehicle manufacturers.

First. Do not waste your time in an effort to obtain a reduction in electric rates; the entire elimination of the cost of current for charging would result in a saving of only 10 per cent. of the total expense of operation and ownership.

Second. Do not expect the central station to sell your cars for you, or to spend unreasonable sums of money in advertising electric vehicles. Do not urge the displacement of revenue producers that are, at present, many times more effective, to make room for electric vehicles.

Third. Do not expect the electric-service company to go into the garaging business for the purpose and with the expectation of obtaining the profit of the business from the sale of current.

To urge any of these measures will only waste your time and that of the central-station manager, and delay genuinely productive co-operative efforts.

In the foregoing, I do not want to be over critical, but there has been so much unfounded criticism of the central stations because of their "failure to assist the electric-vehicle manufacturers," that I believe my statements have been warranted. I believe that many electric-service companies have been very slow to take up and push the sale of electric vehicles as it should be pushed, and that, thereby, they have failed to grasp an excellent opportunity to co-operate with you to mutual advancement. I now wish to offer a few suggestions, which, I trust, may lead to better co-operation and speedier recognition, on both sides, of the benefits to be derived therefrom.

Suggestions to the Electric-Service Companies

First, there are about 1500 copies of the Electrical Salesman's Handbook, published by the Commercial Section of the N. E. L. A. (new sheets for which are issued quarterly) in the hands of as many central-station power and lighting solicitors, each daily calling on the manufacturing companies and other big industries in his city. This loose-leaf book contains accurate data on the consumption of current, and a description of the application of electric power to the various miscellaneous industries. The book is very instructive, highly esteemed and constantly referred to by both the solicitors and their prospective customers in determining the merits of electric power. Only a limited amount of data on the subject of electric vehicles is contained in the book at present. It should contain a great deal more and of a very comprehensive nature. An immense quantity of such data is available, but has never been offered to the Commercial Section. The Commercial Section recommends, therefore, that the Electric Vehicle Association appoint a committee to collect the most reliable and dependable data available, showing the cost of operating electric vehicles in various classes of work, the saving and increased efficiency that may be effected, giving briefly the information required by a prospective customer in making an intelligent decision in solving his transportation problems. This data, if properly compiled, will be recommended for publication and distribution by the Commercial Section to its membership.

Second. Under present conditions, I believe you will agree with me that only a very small part of the advance information received by vehicle manufacturers concerning prospective purchasers of vehicles originates from central stations. The exact reverse should be true. I would recommend, therefore, that in approaching central-station companies the manufacturers urge that the central-station representatives—new business men especially—be instructed to report all prospects which come to their attention. These men spend practically all their time among the very people that the manufacturer is trying to reach and should be able to render considerable

assistance in giving advice to prospective vehicle purchasers.

Third. A great many electric-service companies credit their commercial men with contracts signed and so rate them for promotion, advances in salary, etc., and, in some cases, give them a monetary commission for such contracts. I do not, however, know of any company crediting its men with the placing of electric vehicles. In central-station work, the greatest credit is given the solicitor or salesman who displaces or prevents the installation of an isolated plant. Then why should not the salesman have credit for placing an electric vehicle, which surely displaces an isolated plant—a gasoline engine of from 20 to 75 h. p. capacity? I earnestly recommend that the central station be shown that just as much credit should be given for the placing of an electric vehicle as for a contract for any other power of similar character. True, the central-station company now gives its salesmen credit when a rectifier or charging equipment is contracted for, but it should be remembered that the revenue is not proportional to the number and capacity of rectifiers or charging equipments installed, but to the number of *machines* charged, whether they be charged in individual private garages or all at one place. The giving of proper credit to salesmen by central stations for the sale of, or for being instrumental in the sale of, electric vehicles will be equivalent to the addition of several thousand vehicle salesmen to the forces now at work in the field.

Fourth. Wherever such a step is feasible, it should be recommended to central stations in the cities of medium and small size that an inspection department be maintained for the purpose of examining vehicles without cost to consumers and giving owners whatever technical advice they may desire. This cannot be made a general recommendation, because I do not believe that it applies to all central stations or communities, and would be unwarranted and impracticable in large cities.

Fifth. For the purpose of instructing and educating central-station employes in the construction and operation of electric vehicles and in the advantages to be derived from their use, that the manufacturers co-operate with the central stations by offering a brief course of instruction, preferably at the manufacturer's plant. This should compare, on a small scale, with the lecture courses now offered by the large manufacturers of electrical machinery.

In concluding, I wish to invite the frankest possible comment and criticism and to ask that any and all suggestions that you may have to make on this very important subject be offered freely and fully. I can assure you, speaking for the Commercial Section of the National Electric Light Association, that the progressive electric-service companies are willing and anxious to co-operate with you in every feasible way for the advancement of the electric-vehicle industry and that they will be only too glad to take up and adopt any reasonable suggestions that are offered and to meet you more than half way.

New G. V. One Thousand Pound Shaft-Driven Wagon

THE latest offering made by the General Vehicle Company, of Long Island City, N. Y., is a 1000-lb. shaft-driven electric wagon, which is an improvement on this company's present 1000-lb. machine in many ways.

The new machine is designed to best meet the requirements of delivery systems. It is of pleasing design and gives more mileage per charge than is required in the average day's work.

Mileage and Battery Equipment

The new 1914 model has a speed of 12 or 15 miles per hour and a mileage of from 45 to 65 miles per charge depending upon battery equipment. The wheelbase has been increased from approximately 86 in. to 108 in. and the battery taken from under the frame and placed under the hood. Notwithstanding the increased wheelbase, the turning radius is about the same as the shorter wagon and the inside loading space is approximately the same. The battery equipment is either G. V., G. V. X., Ironclad or Edison, in such units as to give the necessary mileage desired.

Control and Drive

The controller is of continuous torque type, four speeds ahead, two reverse, located under the seat in a sheet metal box.

The drive is by single motor with double universal jointed shaft and worm drive in rear axle. The worm is the latest Brown type with steel worm and bronze worm wheel on bevel gear differential. The rear axle is of full floating type, fitted with Timken roller bearings.

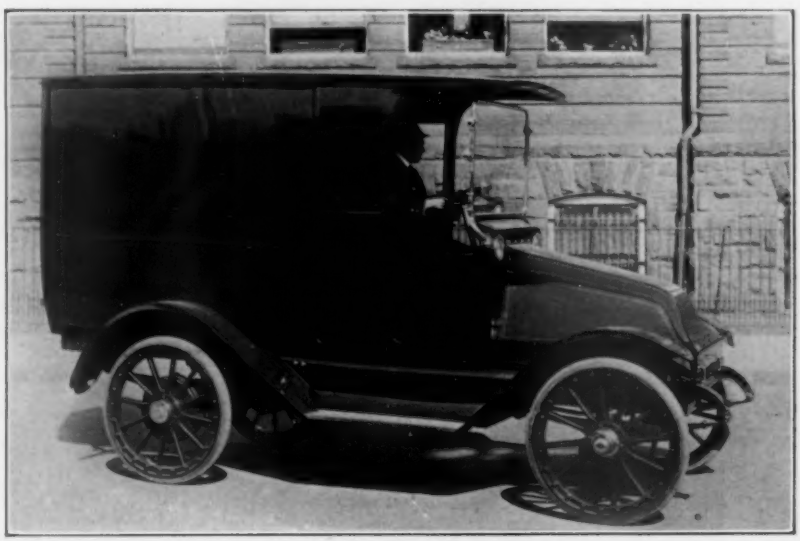
Safety Devices

Special attention has been given to safeguarding this vehicle against accidents. A Controller Throw-Off cuts off the power, if not already cut off by the controller, upon the application of either brake. An Emergency Brake Lock, prevents the emergency brake from being locked except when running switch is either in "neutral" or "charging" positions, and cannot be released until the switch is thrown into "running" position.

A Running Switch can be thrown into "running" position only when the controller is in neutral position. These devices increase the safety of the driver and the public, and make certain that no harm will come to a vehicle left standing alone.

The "Controller Throw-Off" allows the driver in an emergency to use both hands in steering the vehicle and at the same time cut off all power and apply two brakes. This means instant stopping to prevent an accident.

The "emergency brake lock" necessitates that the driver turn off the running switch when leaving the vehicle. It also prevents anyone from releasing the brake while the vehicle is standing, if switch handle is removed. This means the vehicle is left alone in safety. As the brake cannot be released until switch is thrown on, it reminds driver of that fact upon his return to the vehicle. The "running switch lock" prohibits the accidental starting of the vehicle, which might happen if the controller had been thrown on during driver's absence, and upon his return he threw on the running switch without looking at the controller.



The New G. V. Shaft-Driven Wagon

Capacity, 1000 lbs.; wheelbase, 108 in.; gauge, 58 in.; loading space, 72 in.; width, 41 in. and height 60 ins.; 36 x 3 in. tires, front and rear; mileage, 45 to 65 at 12 m.p.h. and 40 to 50 at 15 m.p.h.

Advantages of Commercial Motor Cars in Cotton Manufacture*

SOMEWHAT over four years ago this Association, at Boston, listened with patience to my reading of a paper, which on request I prepared on The Mill Yard Transportation Problem.

During the past few years, many journals and textbooks have used this paper in full or in part as an argument for the introduction of motor vehicles as the economical, hygienic and best method of transportation around and through mills and factories. At the time the first paper on mill yard transportation was presented in 1909, only a few of the textile mills in the country had attempted the use of motor vehicles for their yard work, but since that time the introduction of motor trucks, especially those propelled by electric power, has increased in the Northern States with a steady, healthy growth.

The Transportation Problem

The problem, which I am happy to say many mill and factory men have solved, still confronts many agents, superintendents and yard masters; the problem of the proper, expeditious and economical handling of the raw material as it arrives, as it passes through the various processes until it becomes "finished goods," and then is delivered to the storehouse or to the freight house, where the responsibility of distant delivery is turned over to the railroad or steamship line.

Not only are the problems of transportation encountered in handling the actual raw material, material in process, and the finished goods, but in the many contingent parts of mill work there also arises numerous calls for transportation of some character, which work can usually be much better done by motor vehicles than by any other method.

The bales of cotton or bags of wool and other raw material or general supplies, if not delivered by the railroad direct into the storehouse, must be carted there.

Perhaps it is then necessary to team it to the picker room, to start it on its long journey through the course of manufacture. After being spun into yarn, it may be necessary to transfer it to a somewhat distant mill.

The goods being woven may have to be carted to the bleachery, the dyehouse or the finishing departments, and from these to other departments or to the storehouse, and perhaps later to the freight house.

Not every mill is so fortunate as to have its coal delivered from the railroad cars or boats direct to its coal sheds or boiler rooms, and therefore many mills are confronted with the additional problem of the transfer of coal from railroad lines and wharves to their own storage, and from there to their boiler rooms, many mills making two, and some, three transfers.

After the process of combustion, the ashes must be carted to such places as are being filled, or to the dump. Three of New England's large textile mills are making a profitable business of selling their ashes for sidewalk construction and filling purposes, making deliveries by motor trucks.

The material for shipping boxes does not come in on wings; it requires hauling to the carpenter shop and from there as boxes to the finishing room or shipping department.

The barrels of dye and bleaching materials will not roll themselves to the storehouse, and from there to the dye works or bleachery; they must be teamed, and their weight is such that they make heavy loads.

Lumber must be moved to the various places around the mill yard where repairs are going on, or if construction work is in progress, bricks, lime, cement, crushed stone and gravel must be carted.

Twentieth Century Methods

We no longer weave by hand, nor do we travel by the stage coach, and as the world moves, so the conditions around the factories and mills change. Therefore, we should no longer cling to the use of brute force for the transfer of heavy weights.

In order to avoid the fire risk entailed with steam locomotives, various experiments have been made in yard transportation, with compressed air. One of the experiments met with considerable success at the Plymouth Cordage Works, where small locomotives supplied with compressed air drew and shifted industrial cars. But this method was finally abandoned.

The Trackless Vehicle Desired

As vehicles operating around a trackless mill yard and town or city roads must be supplied with power, the nature of the motor is first to be considered. Electricity seems to be the most natural power to be considered, not only on account of its cheapness, but because of its cleanliness, safety and flexibility. Therefore, the logical method of transportation for the mill and factory yard is trackless, electrically driven vehicles. As the conditions are trackless, the vehicle used must be self-contained, which means that its power, derived from the generator, must be accumulated in storage batteries; therefore, we have given as the desirable method of transportation an electrically driven, storage battery truck.

Just as the electric street car has solved the problem for passenger transportation in cities, so has the electrically driven truck opened the way to a simple freight and delivery system around mill and factory yards, and towns and cities.

The Electric Vehicle

The electric vehicle for trucking and delivery is purely a mechanical proposition. It is a machine. Like other machines it can be built to do a given amount of work in a definite time at a certain cost under any known conditions.

The safely carried load in pounds or tons is the basis of its mechanical design and construction. The specified speed with full load on hard level determines how much power will be required. The specified duration of continuous operation at full load on a hard level determines the amount of energy that must be stored in its battery at one time. This last condition fixes the size of the storage battery. The power and speed required determine the size of the motor and the gear ratios, while the total weight affects the tire design.

The cost of transportation by electric vehicles can be determined just as logically as the cost of operation of any other machine. It is merely a question of measuring the work and measuring the cost and placing one against the other.

Accurate engineering can be applied to the problems of transportation with greater satisfaction with electric vehicles than any other type. Electrical measuring instruments reveal, and record, if necessary, the condition and performance of storage batteries and electric motors. The cost of producing electricity is a known quantity. The amount of electricity necessary to charge a battery is measurable. The amount of electricity delivered to an electric motor by the battery is a known quantity, or can be measured. The performance of an electric motor is accurately specified for any condition. Its efficiency is easily determined.

The work of moving a ton a mile per hour on a hard level road is expended in starting it from rest and in overcoming the resistance of the road, the tires, the bearings, and electrical circuits and the air. If the road is not hard or not level, of course more work will be required to overcome its resistance, or to move the load up a grade. If it is necessary to start often from rest, more work must be done than for continuous motion.

Selection of Electric Vehicles

The electric vehicle cannot be used profitably where it is not needed. Where the work to be done is less than half the ability of the machine, proper value may not be derived from the investment.

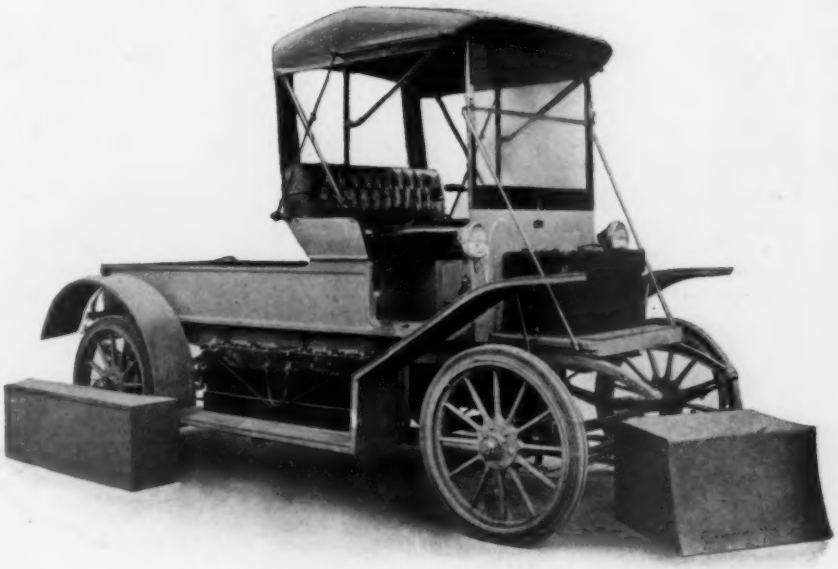
*Abstract from paper read by Day Baker at meeting of The National Association of Cotton Manufacturers at Atlantic City, N. J.

Where a large number of vehicles are used the advantages of electricity become more apparent and the efficiency of the service is still more improved.

Transportation by electric vehicles is a subject simply to explain and easy to demonstrate to the satisfaction of anyone interested. The selection of the proper equipment, however, depends on the engineering sense of one familiar with the problem.

Arguments Favoring Electric Trucks

Among the many arguments which should be considered in connection with electric motor vehicle work over horse drawn trucks are, first, the cleanliness in garage and around the yards. The vehicles and the motors driving them, running on very generously proportioned ball and roller bearings, which are sealed and dust tight, require oiling only once in six months, and therefore have not the dirt and hot oil throwing proclivities incidental to other forms of motor vehicles. Second, the electric method is much cheaper, requiring a less number of vehicles, therefore less drivers, and the loading and unloading crews are less, or the present force is kept busier. Third, while the current for the charging of the batteries is figured in all commercial estimates on which this argument is based at four cents per kilowatt hour, it is a fact that most mills or factories can operate a small wheel or a small engine during the night, furnishing power to charge the batteries, or taking current from the lighting plant before the peak of the load, utilizing power which would otherwise go to waste, thus reducing the cost of current to a small fraction of a cent per kilowatt hour. Fourth, the flexibility in the handling, light or heavy loads carried with equal ease, the turning of vehicle and backing to freight cars, doors or elevators, and its ability, on account of occupying only 60 per cent. of the space used by the horse drawn vehicle, flexible steering, and starting and stopping devices, to travel in congested yards or buildings. Fifth, it can be run into factory buildings, on elevators, into shipping rooms or freight houses, and on docks and wharves, all of which places are barred to the gasoline truck by insurance regulations. Sixth, and most important, the money invested in electric motor vehicle transportation will produce a larger dividend, when compared with present horse costs, than is earned in any other portion of the manufacture of goods.



New Capitol Light Delivery Car

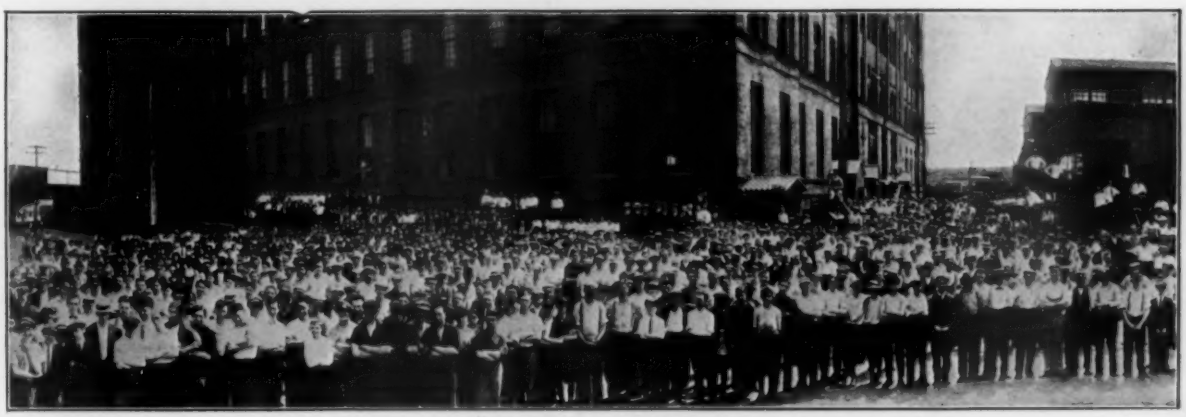
Weight 1800 lbs.; wheelbase 108 in. Note novel disposition of battery at front and side

CAPITOL COMPANY BRINGS OUT NEW MODEL

The Capitol Truck Manufacturing Company, 323 Boston Building, Denver, Colo., is featuring a new model light delivery electric which weighs only 1800 lbs. The battery consists of thirty cells, each having thirteen plates. The motor is of General Electric manufacture and is of series wound type. The controller, of continuous torque drum type, provides four speeds forward and one reverse. Frame is of pressed steel. Drive is by shaft to the rear axle, which is of floating type, the front axle being a drop forging.

Steering may be by either wheel or lever at the option of the purchaser. Springing is semi-elliptic both front and rear, the former being 40 in. in length, the latter 48 in. Special pneumatic tires or dual solids may be used, the size being 34 x 4 in. Two sets of brakes operate on the rear wheels, all wheels being of the artillery type, second growth hickory. Wheelbase is 108 in.

In regard to performances, the Turner Moving and Storage Company, of Denver, who have one of the Capitol trucks in use, state that on August 30 of the present year, the truck delivered twelve pianos and one piano-player, carrying the operator and two men to handle the pianos. The distance covered was 41 miles with a current consumption of approximately one-half the battery capacity.



Noon Hour at Factory of Electric Storage Battery Company

One of the buildings of this company's plant, located at Philadelphia, Pa. The men are just returning to work. This company manufactures storage batteries especially designed for electric vehicle propulsion, which are extensively used

PALMER-MEYER ADDS THREE THOUSAND POUND TRUCK

STRENGTH in every detail of construction and durability in service are the features of the new 3000-pound truck which the Palmer-Meyer Motor Car Company, of St. Louis, has added to its 1914 line. The truck was designed by its engineering department and every part has been selected with a view of giving the greatest amount of efficiency in a motor vehicle of its weight.

The motor is a Continental four-cylinder; cast en bloc; L-head type; 4⅛-in. bore, 5¼-in. stroke. The magneto is a Bosch high tension, with variable spark. The Stromberg carburetor is used. The new truck develops a speed of 15 miles an hour under load. The steering-wheel is on the left with the control lever in the center. The spark and throttle levers are on the steering wheel.

The transmission is of the selective type, having three forward speeds and reverse. The clutch is of the multiple disc type. Transmission, cluth and steering-gear are of the Warner make. Drive is through chains, having a pitch of 1¼ in., a roller diameter of ¾ in. and a width of ⅝ in.

The frame is made of five-inch heavy channel, filled with wood and gusseted with heavy corner angles. It is hot-riveted throughout with ⅝-inch rivets. Absolute rigidity of frame is assured.

The front and rear axles and jackshafts are all Timken products, having of course, Timken bearings throughout. The main shaft has two universal joints well supplied with grease cups which require but one filling a season.

The springs rest on slides, external and internal oiling, and have two large spring bolts in front horns internally greased and working on Tobin bronze bushing. Front springs are 2¼ x 38 in. and rear springs, 2½ x 50 in., both front and rear being half elliptic.

The starting crank and all brake rods are seated in Babbitt, assuring perfect fit and alignment. The wheelbase is 130 in., longer to order, and the tread is 58 in. The front wheels are 34 x 4 in. (S. A. E.); the rear wheels, 34 x 5 in. (S. A. E.) regular, or 34 x 3½ in. dual block to order.

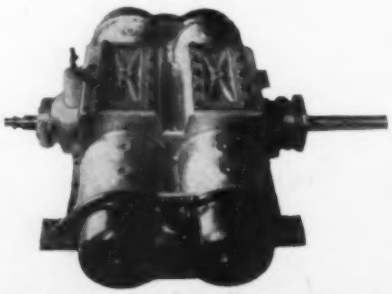
The splash and force pump lubrication system is used, thus insuring maximum protection from wear. The radiator is of the honeycomb type, set on springs, with circulating pump. Brakes on the jackshaft are external contracting, 12½ x 2½ in. The brakes on the rear wheels expand internally and are 16 x 2¾ in. in dimensions.

The chassis is regularly furnished with priming coat of paint. The front and rear fenders are enameled in black. The standard equipment with the chassis includes two oil dash lights, one oil tail light, one heavy auto jack, set of wrenches and tools and bulb horn.

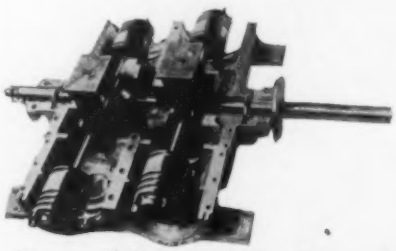
The New Palmer-Meyer Three Thousand Pound Truck

TRACTOR AND ENGINE OF UNUSUAL DESIGN

A six-cylinder engine of unusual design is installed in a heavy tractor, also of novel construction, which is nearing completion in the Los Angeles plant of the Homer Motors Company. The unusual features of the motor are the simplicity of design, lightness, small number of moving parts and the arrangement of the cylinders. The cylinders are set opposite each other in a solid cast iron frame and work as a unit. This type of engine has been built and tried out as a two, four and six-cylinder engine; the two-cylinder being used for more than a year in a light delivery car, the four-cylinder in a pleasure vehicle and the six-cylinder in a heavy car. In each type the same essential features are retained; the opposed cylinders; the elimination of valves, cam pushrods or camshafts. This engine is of the two-stroke cycle. Its simplicity is indicated by the fact that the four-cylinder type has only nine moving parts and the six-cylinder only eleven. The use of the Scotch Yoke, a feature of the steam engine, has been applied to this gas engine, as shown in the illustration of the engine with half of crank case removed.



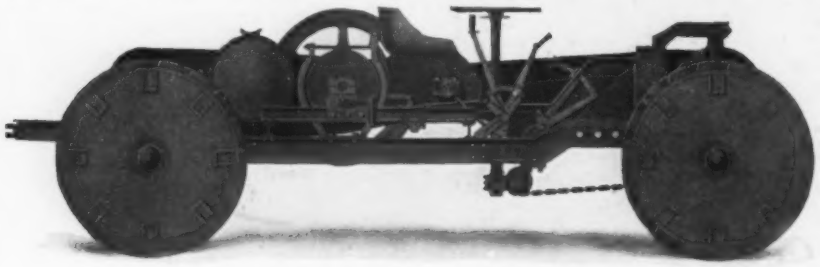
Exterior of the Four-Cylinder Motor



Showing Half of Crank Case Removed

The tractor now nearing completion has a weight of about 5000 lbs. is equipped with a six-cylinder motor that delivers 75 h. p. It is built for power, not speed, having a range of 1½ to 10 miles, planetary transmission, with three speeds forward and reverse. It is a four-wheel drive by jackshaft to each wheel.

A novel feature of the tractor is that it is set very low, having a height of only 4 ft. This makes it available for orchard use. It has a wheelbase of 100 in. The wheels are of metal with very broad tread and the front axle is equipped with a novel universal rotary joint which is designed to accommodate itself to the inequalities of the rough ground which a farm tractor must cover. The tractor was designed by John P. Barker.



New Homer Tractor

Weight two and a half tons; wheelbase, one hundred inches

Trucks to be Used in Mine Rescue Work

TO RESCUE, revive and treat entombed and injured miners and thus reduce the loss of life and lessen the injuries resulting from the periodic disasters in the coal mines of the United States, the Bureau of Mines of the Department of Interior has evolved a new plan of relief work involving the extensive use of motor rescue trucks of a special design equipped with all the paraphernalia known in the science of relief work.

The first vehicle of the new type, built according to government specifications, was constructed by The White Company, of Cleveland, Ohio, and delivered to the Bureau of Mines in Pittsburgh, Pa. It is a veritable hospital, carrying every piece of portable equipment that is useful in rescuing miners, quenching flames, resuscitating the unconscious and administering first aid.

Included in the equipment are two pulmotors, six oxygen tanks, fifty regenerators, an oxygen pump, two stretchers, a life line, box of explosives, lanterns, tents, fire extinguishers, complete telephone system and a full complement of hose, axes, saws, miner's tools and medical and surgical supplies. The equipment is complete even to the extent of providing for the bird and cage that are used in detecting poisonous gases in mine shafts.

A majority of the members of the American Mine Safety Association, who saw the first truck in operation during their recent convention in Pittsburgh, predicted a big reduction in casualties. A mine explosion, with all its effects except human injury, was staged during the convention. The truck with its full equipment was tested by government representatives while moving picture operators, also employed by the government, recorded every act and movement to show absent mine operators how lives can be saved and danger lessened.

The Bureau of Mines has proposed that mine owners in each district establish motor rescue stations at central points from which each district may be served. This phase of safety in mine work was one of the principal topics of discussion at the convention, all of the members of the association showing a keen interest in the new motor vehicle.

Inasmuch as instant access to everything is essential, the truck body has been built

Rear View of the Truck

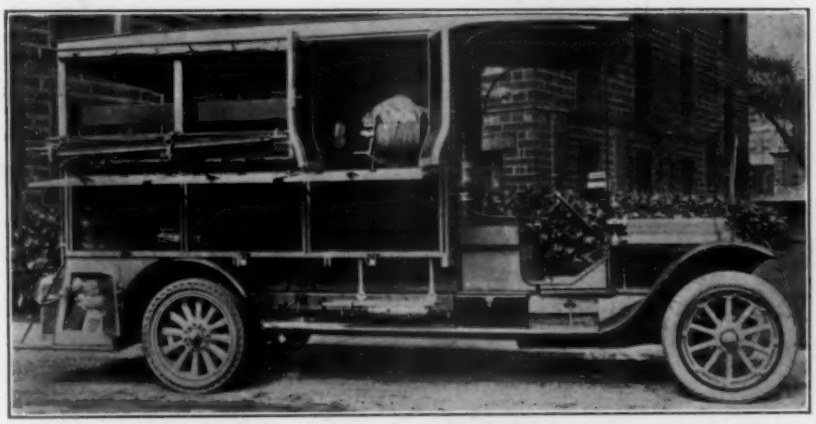
The crew is carried in the compartment above, while the tools, etc. are carried in the lower drawers.

with a special place for everything it carries. And everything must be in its proper place. To this end, the entire carrying space, except for the crew of trained rescuers, consists of compartments of varying size and odd shape, nearly all opening on the outside of the truck by means of snatch hooks.

Under the driver's seat are carried ten Draeger reviving outfits. Six oxygen tanks are carried beneath the body on a specially built sub-frame and cradle, the tanks lying crosswise of the truck so that they may be pulled out quickly when necessary. On the left side of the chassis frame there is attached an oxygen pump, which is operated by the power of the motor. In back of the driver's seat there are hooks for a five-foot crowbar and tent poles.

Immediately in back of the driver's seat and extending the full height of the truck there is a series of compartments opening on the outside of the truck. These compartments carry a tent, 22 ft. of hose, three miners' picks, three miners' shovels, one four-pound sledge and two hand axes. In back of these compartments are two seats, arranged lengthwise, with folding lazybacks and protected by a brass railing. Beneath the seats there is a series of smaller compartments. Beneath the rear steps there is another compartment with doors at each side and in the end. There are also shallow drawers to take saws, hose couplings, reducers, spanners and 200 ft. of half-inch rope.

The central compartments along the sides of the body contain one life line reel, a telephone system, part of which is carried into the mine, and an assortment of compasses, braces, bits, chisels, hacksaws, blades and snatch blocks. Suspended on the outside of the body on specially designed hooks and clamps are stretchers, fire extinguishers, axes, lanterns, etc. Two special boxes are built on the running boards to accommodate a large number of mine lanterns and small boxes are built on the rear wall of the forward compartment to carry two first aid boxes and a pump. The truck is equipped with an 8-in. swivel headlight, mounted on the dash and is fitted with non-skid tires. It is painted battleship gray with black striping.



White Truck Built for Mine Rescue Work

The compartments carry a wonderful variety of scientific paraphernalia, such as pulmotors, oxygen pumps, tanks, respirators, fire extinguishers, explosive materials, a complete underground telephone system, full stock of miners' and firemen's tools, complete ambulance equipment and medical supplies.

DETROIT GROCERS ENTHUSIASTIC TRUCK USERS

Volkman Brothers, grocers of Detroit, Mich., purchased a Hupmobile two years ago and are highly pleased with the results obtained. Previous to their buying the car, they had three horses and two wagons, resting one of the horses every day and using the other two for delivery purposes. As their business grew they found great difficulty in pleasing their customers and giving them satisfactory delivery service. Another horse and wagon meant another driver, with horse care, expense and trouble.

They finally decided to purchase a small delivery car and state that they are able to do the same amount of work with it in one-half the time it took the horses and wagons. Besides having an extra clerk in the store they are able to give added attention and better service to all the people they are called to wait on.

The delivery service is now operated on an economic and efficient basis. Deliveries are made within a radius of

two miles from the store once every hour, guaranteeing almost immediate service to the consumer. This service has placed Volkman Brothers far above the average grocer and consequently they are becoming well known in the eastern section of Detroit for their excellent and speedy deliveries.

The cost of operation of the car amounts to almost nothing, about $10 to $15 per month being the average. There is no care after the day's work is over. The car is simply placed in the barn and left there.

The horses previously used cost over $50 per month. There was something continually the matter, either a sick horse, feed bills, a bruised ankle or something. These bothers have now been all done away with besides getting far more satisfactory results.

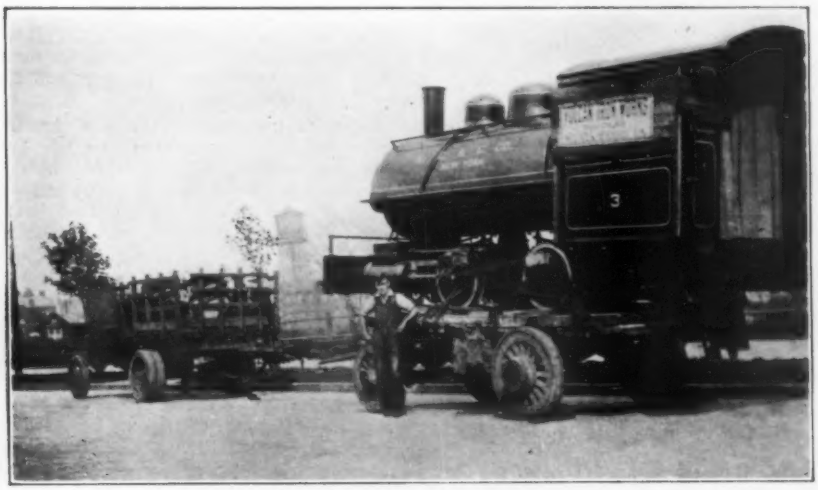
Building Roads With a White Truck
A New York contractor uses this five-ton machine in road building

load up the hill on three cylinders. Four blocks further on a 10½ per cent. grade was encountered, which was about 800 ft. long. The road was then level for about three-quarters of a mile, and then a hill of three-quarters of a mile long and a 12 per cent. grade was reached. The destination was about a quarter of a mile from the top of the hill.

ROAD BUILDING WITH WHITE TRUCK

Street and road building is a rather important field for the general contractor, and in this work motor trucks have been tried out to a considerable extent, handling all sorts of material, from the dirt removed, to hot asphalt. The Leahy Contracting and Construction Company, of 1446 Prospect Avenue, New York City, has in service two five-ton White trucks with hand operated dumping bodies.

The trucks are used to clear away the old material and to furnish the new. The average hauls for these trucks to the dumping ground is about a mile and a half, and while one is being loaded, the other is dumping, so that when the empty one returns to the job the loaded one is about leaving. These trucks average two round trips every hour and a half, so that in a day an average of ten trips can be made. Since the White trucks have been in service, the working radius from the job is increased to three or four times what it was before.



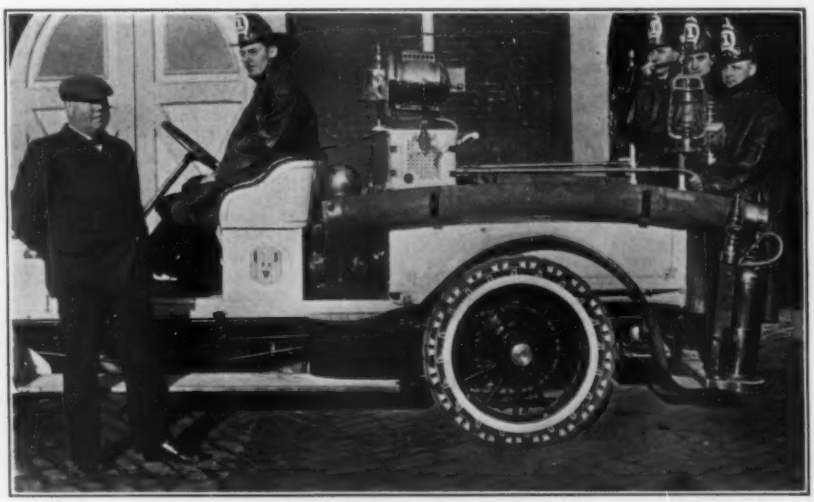
Locomotive Hauled by Truck
The locomotive weighs eighteen tons and is being hauled by a La France hydraulic truck. The interest with which performances by the commercial car are being viewed in the business world to-day is ably illustrated by the fact that the Pathe Freres Moving Picture Company considered this haul noteworthy, and took moving pictures of it.

EIGHTEEN-TON LOCOMOTIVES HAULED BY LA FRANCE HYDRAULIC TRUCK

Three locomotives were shipped by rail to the Beaver Engineering & Construction Company, on Staten Island, and were delivered at the B. & O. freight station in Tompkinsville, Staten Island. These engines had to be hauled to West Brighton, where the job is located.

The engines weighed eighteen tons each, and were loaded on platform wagons weighing 5 tons each. They were hauled by a LaFrance hydraulic truck.

The route was down Bay Street to Tompkinsville corner. On Bay Street a grade of 4 per cent. was encountered. From Tompkinsville Corner the route went up the Richmond Turnpike and one block up the grade was 8 to 9 per cent. for a length of two blocks. Starting up this hill one of the priming cups on the gasoline engine opened, and in trying to close it, it broke off. The truck finished the haul and pulled the entire



Favary Tires Make Good on Fire Truck
This fire engine, weighing 3½ tons and equipped with "Favary Tires," was driven at an official speed of 50 m.p.h. It is stated that no side motion or noticeable rebound was shown when traveling at this speed.

The Fourteenth Paris Automobile Exhibition

Commercial Vehicle Section, October 17-27, 1913

By OUR FOREIGN CORRESPONDENT

THE exhibits in the Commercial Vehicle Section are fewer than they might otherwise have been owing to the commercial car part of the show having been organized at the eleventh hour. Notwithstanding this thirty-two firms put in an appearance, and, although there was not much novel, one or two new models were to be seen. But even these new models followed conventional practice in their general outlines.

General Features of French Design

If one were to judge of tendencies from the exhibited types—which it is hardly practicable to do—the following would inevitably be formed.

1. Vehicles with bonnets as opposed to those in which the driver's seat is placed over the engine are coming more into favor.

2. Engine practice on the whole favors casting four cylinders *en bloc*, but there are many makers who prefer casting in pairs.

3. Springs are being made much broader and with finer plates, and their attachment to the under side of the axle is becoming more common.

4. For final drive to back wheels the roller chain still practically holds the field, but there are two or three notable departures from this practice and these will probably lead the way for more.

5. Wood wheels are still in the majority, but one or two firms have used cast steel.

6. Attention is being devoted to economy in load handling.

7. The adoption of motor transport by the War Office is leading to more diverse tires being found for the heavy vehicle.

Most of the exhibiting firms say frankly that their models are unchanged, and in the case of Messrs. Saurer, they exhibited the identical two "show-finished" chasses which they had on view at last year's Salon.

Latil Drive and Steer

Method of driving and steering the rear wheels of Latil vehicle. The spring end connection should also be noted.

Side View of Panhard Tipping Wagon in Lowered and Raised Positions

New Models

Delahaye has on view a show-finished chassis with some excellent features. It is of the bonnet type, and built to qualify for the War Office subsidy, having in this connection a load capacity of 7700 lbs., though for ordinary commercial purposes it is rated up to 8800 lbs. It may be summed up as follows: four cylinders of engine in one casting with valves on one side, valve gear enclosed by quickly detachable cover, and manifold neatly incorporated in the cylinder casting, leaving the engine very accessible. A Claudel carburetor is unjacketed, but the induction pipe, about 16 in. long, is water jacketed for some 12 in. of its length. On the other side of the engine all is clear except for the magneto. So far the design is particularly clean, but the centrifugal circulating pump seems hardly accessible without taking down the radiator. The leather on cone clutch can be tightened by twelve T-headed bolts drawing along transverse grooves cut in the periphery. The three-point principle is used for the support of the gear box, which is connected by a universally jointed shaft, to the countershaft, on the ends of which are brake drums as well as chain sprockets. These latter, as in so many French vehicles, are of very small diameter; in fact, the majority of French designers seem to rely mostly on the chains for gearing down. On the back wheels chain sprocket rings are detachable, and the back of the frame is slung on ten plate springs with long double links at both ends. But the two forward pairs of links are connected by an intermediate

crossbar through which pass eye bolts pinned to lugs on the countershaft casing, and by these means chain tension is adjusted. Springs are attached to the under side of the axle, presumably to give greater clearance where it is most wanted, for such an arrangement affords but little real greater facility for spring removal.

The Latest De Dion

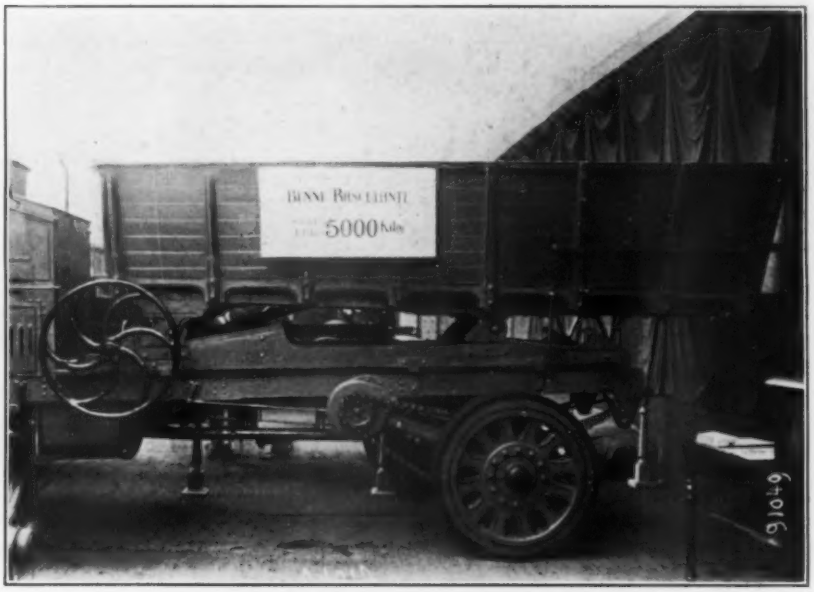
The De Dion Company show a 20-30 h. p. bonnet type chassis for 6600-lb. load of which the following brief particulars are noted. Engine cylinders cast in pairs, thermo syphon cooling, circular radiator with internal jam. (Solex type.) The engine is slightly inclined in correspondence with the centre line of the propeller shaft, which is enclosed and terminates in a differential covering bolted to a cross member of frame. Final drive is through the familiar De Dion double cardan shafts to internal gear rings on driving wheels which latter are of wood with solid Bergongnan tires 930 x 120 mm. The frame is of pressed steel of substantial thickness and the main springs have nine plates of average width.

A Saurer Detail

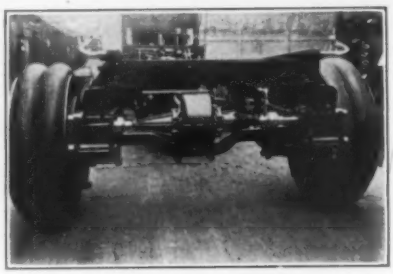
Besides their chassis, Saurer models which need not be again described. They had on view a full sized section model of one of their wheel hubs showing that these are mounted on a massive pair of ball bearings, the outer and smaller of which is finished up tightly in the hub whilst the inner and larger one has free end play. The inside end of the hub fits into a circular groove in the brake cover plate against a ring of elastic material which forms a dustproof joint.

A Subsidized Design

The Berliet Company have been very successful with their War Office subsidy types. In 1912, of the sixty-two vehicles in all tendered for trial twenty-two were rejected, whilst in the present year seventy-three were tried and thirty-four rejected. Of those thirty-nine accepted, the Berliet Company supplied no less than sixteen.



Dumping Body on a Peugeot Five Thousand Kilogramme Truck



Clement-Bayard Axle

Rear axle drive of the Clement-Bayard heavy chassis. Note the very wide springs attached under the axle.

The standard chassis shown by this firm has a multiple plate clutch of the Hele Shaw type. The brake and clutch pedals, change speed and handbrake levers are all carried by a neat box shaped casting forming a cross member to the frame. In the arrangement of gear box cross-shaft, joint chain drive and wood wheels conventional design is followed.

Some Notes on Peugeot

The Peugeot firm had two interesting exhibits, viz.: a new model of two and a half to three-ton load capacity, and a tipping box wagon of 11,000-lb. capacity. The new model has cylinders cast en bloc, pump circulation, multiple plate clutch, four-speed gear box and final drive by worm. Wide seven-plate springs are used and this is one of the very few models fitted with cast steel, hollow-spoke wheels which carry solid tires of 1000 x 110 mm. section. The brake drums—of the internal type are cast integral with the wheels, and the pressed steel frame has quite straight side members which instead of being parallel to each other were some 6 in. closer together at the front end.

The Peugeot tipping wagon is of a type better known in America than in Europe. It has a long box body mounted on two pairs of roller wheels running in steel channels attached to main frame. The forward pair of channels are inclined upward towards the rear and the back pair downward, to assist the tipping action, which is operated by a long central screw worked through by a pair of bevels and cross-shaft at forward end, with a large hand wheel at the side of the frame. On the screw is a traversing block to which is attached a Y-shaped link hinged at its other end to the under side of tipping box. The door of the box is held closed by side lever catches which are freed by coming against a spring stop at a suitable stage in the tipping operation.

The Schneider Detachable-Platform Wagon With Winding Capstan

The Aries Six-Ton Tipping Wagon

Superfluous Finish

The Renault firm, which last year did not show a heavy-weight vehicle, have come out this year with a new model of which the power plant, radiator, etc., are arranged in the usual Renault way. It has cylinders cast in pairs, thermo syphon cooling, leather-faced internal cone clutch, and an enclosed governor. The frame is a particularly massive one of pressed steel strongly braced by cross members and diagonals at rear end, whilst the ten plate springs are extra wide and held up to the underside of axle. The latter is of heavy square section at the spring seats, but the centre part is made as an open frame in which is carried a casing with double reduction and differential gear. The reduction gear is neatly designed and comprises a central shaft—forming a continuation of the propeller shaft from gear box on which is mounted a compact three-pinion bevel differential and bevels at either end which engage with corresponding bevels—one at each side—built up with spur pinions carried by ball bearings on stump shafts in the sides of the casing. The spur pinions in turn engage with gears fitted to the axle driving shafts, these latter have castellated ends and are pushed in from the outside.

Road wheels are of cast steel with massive hollow arms; the rear pair having twin solid tires 970 x 180 mm. whilst the front have singles, 850 x 140 mm.

The front ends of the main springs are pinned to heavy riveted-on brackets, whilst the rear ends are attached to T-slides of liberal proportions. The whole job is of the highest class of engineering, but one cannot help asking if it is not just too high class to be commercially practicable.

Front-Wheel Driving

The Latil front drive tractor is again in evidence and seems to have been improved in detail since last year so that it now gives the impression of being an engineering practicability and not merely a freak: and indeed the extensive list of users, and the fact that one firm has a fleet of eight, another of seven, and several of three—some of which have been at work since 1905 and are still going well—leaves one no option but to accept the Latil proposition seriously.

A Colonial military model, with very good ground clearance behind but only about 12 in. at first axle, though evidently designed for haulage purposes, was yet fitted with pneumatic tires. These points did not give a favorable impression, but on raising them the writer was told that the War Department had specified them so there was no option.

Driving All Four Wheels

In another vehicle shown, all four wheels are driven and steered, and this will take a useful load of 17 tons up a 12-per cent. gradient and can be turned in a street less than 25 ft. between the curbs.

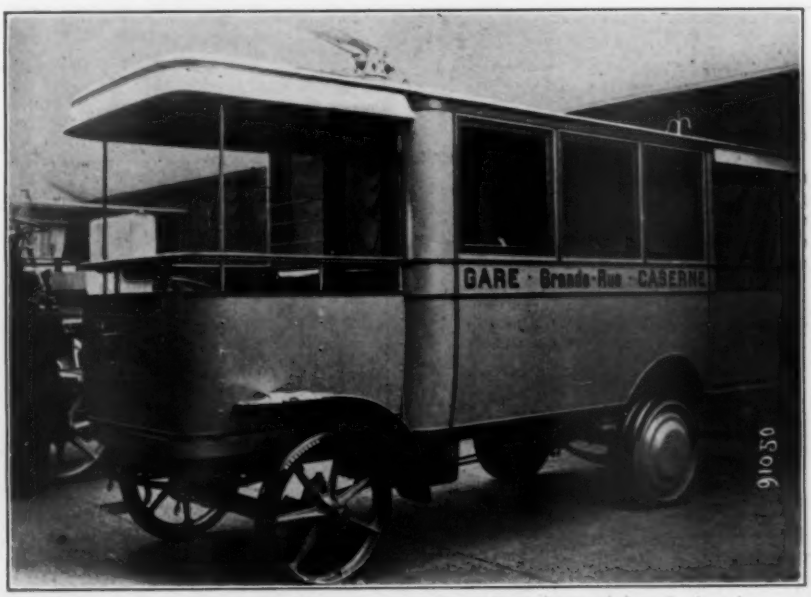
Gasoline-Electric

The Balachowsky & Caire gasoline-electric vehicle was again on view—no change having been made in its design. Regulation of current in this vehicle is such that when a hill or other increase of resistance is encountered, amperes go up and volts go down, watts remaining constant. As the motors are contained within the end wheels all four can be driven and hence great traction power can be obtained. This firm also exhibit an electric omnibus designed to take its current from overhead trolley wires. See cut.

Quick Load-Handling Arrangements

The load handling proposition was exemplified in tipping wagons by Panhard, Peugeot, Aries and a Purrey-Exshaw steamer, whilst Schneider & Company had on view a platform wagon in which the platform is mounted on long rollers by means of which it could be moved on any hard enough surface. Besides this there is an auxiliary frame carried on top of the main chassis frame, and this is used as a ramp up which the loaded body is pulled. Behind the driver's cab there is a clear space left on the chassis on which are arranged a capstan and grooved warping pulleys for handling the load, similar pulleys being fitted at rear end of chassis so that the load can be pulled off or on as required: a snatch block is also hung on the main frame for use in places where a direct pull is not possible. The capstan, central pulley and snatch block are all clearly seen in the photo which shows also the wide, plain-tired driving wheels and sand box. It will be noted that the capstan is operated by bevel gear and a chain drive from engine shaft.

Referring again to the tipping wagon exhibits, the accompanying illustrations show respectively the Panhard and the



Balachowsky and Caire Trolley Electric Omnibus

Aries vehicles. The former has a steel box body mounted on three pairs of rollers which take a path on the lower flange of a supplementary frame. The turned down ends of this latter allow the rear pair of rollers to drop, while portions of the upper flange are cut away, near the forward end, to allow the front pair of rollers to rise. Traverse of the box is effected by two endless chains, hand operated through the reducing gear seen in the cut just above the chain sprocket. The two projections on forward side of the down turned channel frame are designed to hold a pair of jack feet which are blocked up to take the weight in tipping.

The Aries wagon is much larger, being designed for six-ton load. The body is of steel, but it is pivoted at a fixed joint just over the rear axle, the tipping being done by a long screw the top end of which is forked and attached to the end of a strong laminated plate spring which is rigidly bolted up to the under side of the box. The operating nut for this screw is supported in a trunnion bearing and can be worked by hand or power as required, but hand operation is considered quite sufficient.

Open to Criticism

The cut of this Aries wagon shows up two points at which criticism might be directed: the very small diameter of the chain pinion—as already stated, this defect exists in nearly all the vehicles shown and the rear wheel brakes placed outside of the hubs, a position in which they are obviously exposed to damage. This position of brake, however, has long been adopted by the Aries people.

A Drive Axle Design

Mention has been made of exceptions to final drive by chain and the illustration of rear axle of a vehicle by Clement Bayard shows one of these exceptions. In this a differential reduction gear is bolted on to the rear axle, and the side shafts from this carry pinions which gear with spur rings with external teeth bolted to the wheels and enclosed in dust casings. The cut also well shows the latest spring design, a pair of very wide seven-plate springs clamped up to the under side of axle.

On this vehicle too we noticed an unique feature unfortunately not visible in the illustration—in the shape of a flexible connection, which is also a spring drive, between engine shaft and gear box. The ends of the two shafts, castellated, are brought close together and have mounted on them two flanged collars. Mounted on these again radially are a number of pairs of spiral springs held in stirrup pieces whose outer ends are attached to the inner periphery of a hollow pulley. It will be realized that the inner ends of each pair of these "spring spokes," as they are, are attached to separate shafts but the outer ends to only one pulley; so, when the engine shaft revolves, the other is pulled round with it.

Our review may be closed by the mention of one other point in French design to which exception may be taken, viz.: that in a large number of cases the crossrod for steering is placed in front of instead of behind the front axle and so is liable to damage. But the engineering construction is, all round, of a high order.

Another Tipping Body Exhibited

MOTOR-DRIVEN STREET SWEEPER AND FLUSHER

The Four Wheel Drive Auto Company, of Clintonville, Wis., is building a new street sweeper and flusher, which we herewith illustrate.

One of these machines is being used with great success by the Commissioners of Lincoln Park, Chicago. In the summer time a flushing tank is placed on the chassis and the car is used for flushing and sprinkling. In the winter time the flushing tank is removed and the sweeper is attached to the front end of the car, propelled by a motor which sits at the rear end of the car and is used for brushing or sweeping the snow off the streets and walks in the park.

This sweeper is built in three and five-ton capacities. A feature of this machine is that it can be used also as a regular truck, a loading space of 11 x 6 ft. being available.

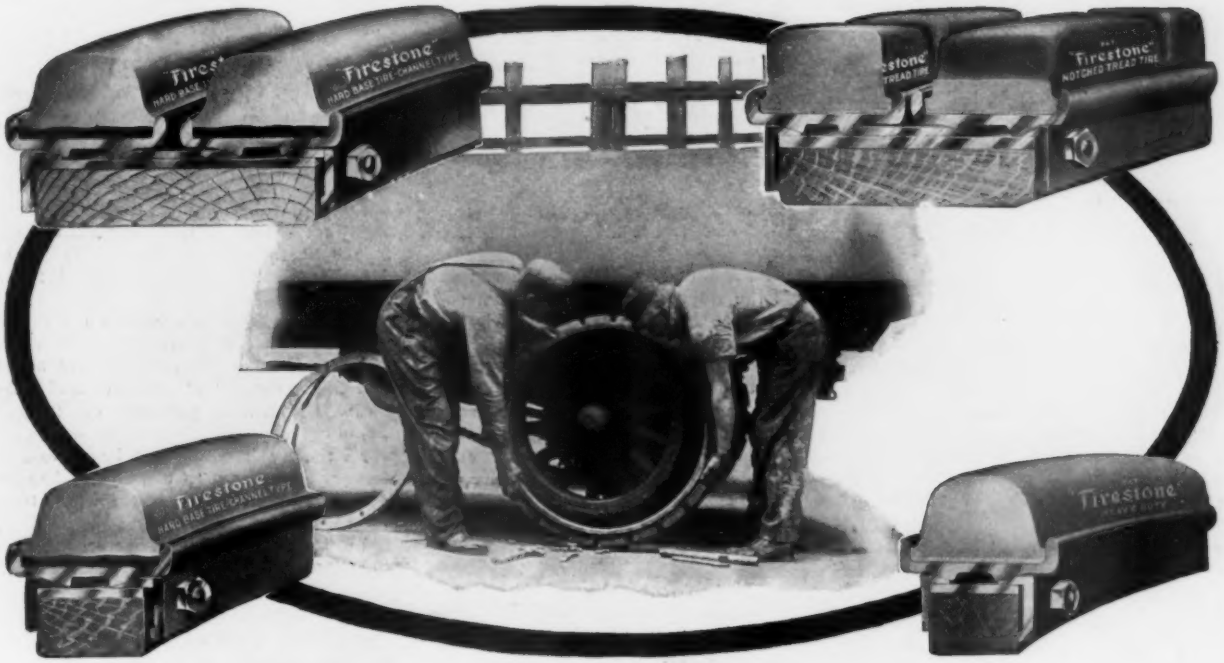
As sweeper a large 7-ft. broom is attached to the front end of the car. This broom is driven by the car itself. The broom makes from 300 to 400 r. p. m., operated, raised and lowered by an operator sitting next to driver on the front seat.

In flushing the water is forced by a high-speed pump driven by the car itself, onto the streets. It is also used for lawn sprinkling and for this and other purposes difference nozzles are attached.

As a truck and flusher one motor only is required. The attachments are built so simple that it takes but a very short time to change from flusher to sweeper or to regular truck.

Street Flusher and Sweeper Used in Chicago

This machine is the product of the Four-Wheel Auto Drive Company, and may be also used as a regular truck



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The Firestone service stations are in all large cities, and they are the most efficient in the business. All Firestone equipment is built to S. A. E. standard. So, regardless of your present equipment, we can serve you best, whatever your tire requirements may be.

No equipment, however, can give you *full efficiency*, no matter what service you get, except the simple Firestone Quick Removable Equipment.

Let a Firestone man call and talk it over. Let him show you the various types of Firestone tires and give you the benefit of his knowledge and experience, in selecting the style best suited to your needs. It is in this way that you will eliminate your truck equipment difficulties and insure yourself—

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The Receipt and Delivery of Railroad Freight

The Pressing Problems of Transportation

By ROBERT L. NILES

HEN it is reflected that no Railroad, Steamship Line, Canal, Tow-Boat Service, Trolley Line, or Steamboat, as to the freight carried, begins at the beginning or ends at the end, that is to say, that every pound thus transported has had to be collected, and will have to be ultimately distributed, by some other method, by horse haulage or manual labor, the volume of such collection and distribution and the importance of the problem becomes most impressive.

The most serious difficulty the Railroads are called upon to solve is the question of Terminal Facilities.

The Freight Car, which, once upon its journey, may readily cover some 250 miles per day, is, at present, by the congestion of terminals, reduced to an effective average of but slightly over 20 miles, as J. J. Hill has so convincingly demonstrated.

At the average return, in freight charges, of ½ cent per ton mile, the earnings per car are therefore reduced from a possible $31.25 per day to an actual $2.50 per day, a figure at which profitable operation becomes well nigh impossible. The anomaly is presented, that the larger a city the less profitable its freight tonnage in proportion.

The manifest solution for such conditions is, if possible, an enlargement of terminal facilities.

Idle Time Disastrous to Truck

Curtailment of earning power to the railroad is not the only result of congested terminals; it involves heavy additional and unnecessary expense to each individual shipper, and to all stevedores and teamsters, and proves the greatest obstacle to the employment of commercial cars in the collection and distribution of railroad freight.

From the standpoint of the general public, its health and convenience, the elimination of horse-drawn vehicles is greatly to be desired, yet, when investigation shows that an average of three hours per working day is wasted in delays at terminals, the commercial car becomes unprofitable for railroad service. Their added carrying capacity and increased speed are discounted by such idle times.

As the result of such detentions the cost to shippers runs as high as 50 cents to $1.00 a ton and over per mile, or to one hundred and two hundred times as much as the mileage charge of the railroad, so that, save for distant points, the haulage charge is greater than the railroad charge.

To the railroad short hauls in the congested district are a source of loss, not profit.

In the interests of both the railroads and the shippers it is evident that some plan should be sought by which these delays may be avoided or diminished.

As expressed heretofore, the natural solution would be the expansion of present terminal facilities, to wit, by extended trackage and platform space, as well as the approaches thereto, yet extensions of present sites would involve staggering expense, and an increase therefore of capitalization difficult, if not impossible, to secure.

Supplemental Freight Stations

There remains, therefore, the alternative of the establishment at other and different localities, of supplemental receiving and delivering stations, where such needed trackage and space either at present exists or may be cheaply acquired.

Such a solution, however, would necessitate much longer individual haulage, which in the case of horse-drawn vehicles would seriously detract from the advantages of the prompt service thereby secured. It is here that the motor truck appears to its best advantage.

With its increased speed and carrying capacity, and ability for continuous, tireless service, regardless of length of time in operation, a comparatively "long haul" becomes less burdensome than a comparatively short "wait."

With horse equipment a "wait" of an hour is preferable to an additional length of haul of ¼ of a mile.

With a motor truck an extra haul of four miles is less expensive than a "wait" of an hour.

With motor equipment it becomes possible therefore to profitably haul to and fro from a distant point provided that by so doing prompt and effective accommodation may be secured.

Some types of motor trucks have the added advantage that they can successfully haul trailers: to wit, inexpensive carrying bodies, without expensive motor equipment. Such trailers to be left to be either loaded or unloaded, at leisure, and ultimately picked up and dispatched by the motor unit itself, either a load carrier or simply a motor, as conditions warrant.

It would appear therefore that through the establishment of such "Annex" Freight Terminals, confined, it well might be, to certain classes of freight, or certain extensive shippers, the congestion of the terminals at present existing would be materially reduced; it seems not too sanguine to imagine entirely removed. Thereby expediting not only such tonnage as was therein handled, but to that still distributed from original depots.

Such service might well do for the various railroads, what the New York Clearing House has done for its associated members, and expedite and lubricate the whole problem of freight handling.

Manifestly it would not be necessary for such a system to attempt to handle even a substantial part of the whole tonnage.

In the City of New York an average of 7,000 freight cars arrive and depart daily.

The majority of such tonnage is handled by the following railroad systems.

Baltimore & Ohio, Central of N. J., Del., Lack. & West., Erie, Long Island, N. Y. C. & H. R. R. R., N. Y. & Harlem, N. Y., N. H. & H., Penna. R. R.

With the completion of the Hell Gate Bridge, all such roads will, or readily might, be inter-connected, and with all but limitless area and trackage surrounded by cheap real estate, and close to the eastern ends of both the Williamsburg and Queensboro Bridges.

At the present time the freight transfers of the B. & O. are at Communipaw or by lighter to various N. Y. piers.

That of the Erie at Jersey City or by similar transfer by water.

That of the Central of New Jersey the same.

That of the D. L. & W. at Hoboken or by water to sundry piers.

That of the Long Island at Astoria or Long Island City.

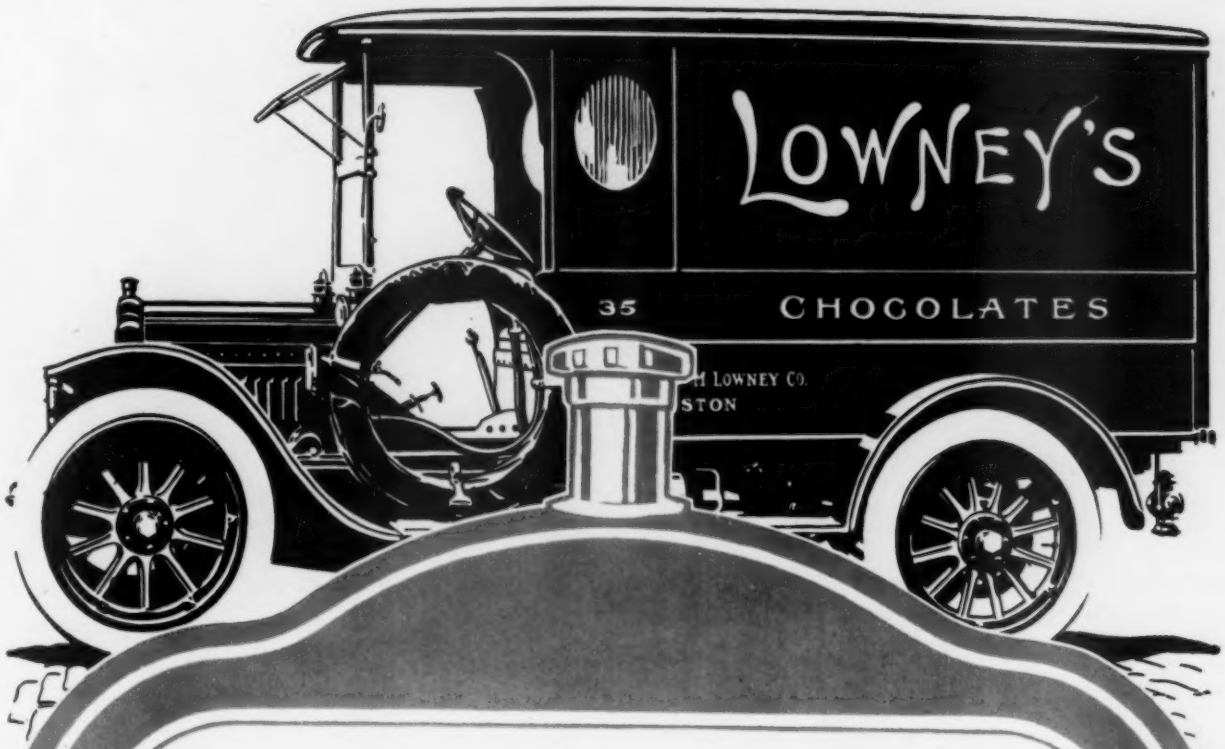
That of the N. Y. C. & H. R. R. R. at 66th Street, 30th Street, St. John's Park and various piers on the North River. The Harlem R. R. at Port Morris and in connection with the N. Y. Central.

That of the N. Y., N. H. & H. R. R. at 138th Street, and by float to various East River piers.

That of the Pennsylvania at Jersey City, at Astoria, Long Island City, and by water transfer to various down town North River piers.

Each of such points of distribution is restricted in area and accessibility, costly to maintain, and in many cases absolutely impossible of expansion and in every case only extensible at enormous expense.

The field of operation will be limited only by the combined tonnage of the entire transportation methods of the country, and the sum total of the congested terminals.



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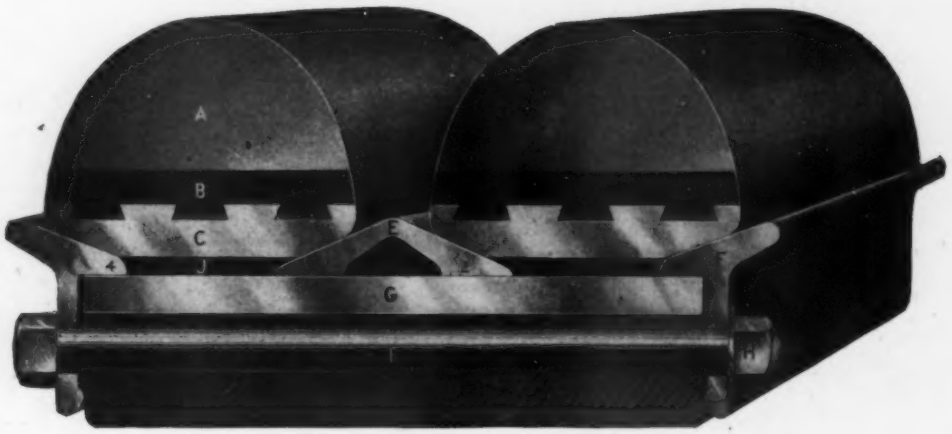

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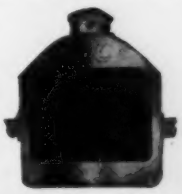
The honeycomb appearance is maintained by placing a corrugated strip between each tube. In case of damage these strips can be removed and the tube repaired. This cannot be done with any other honeycomb radiator.

The corrugations are built to extend in front of the water tubes and protect them from punctures. To every square inch of front area we put in sixteen inches of cooling surface.

This type is very efficient and durable and is used with marked success on many of the leading trucks and power wagons in this country.



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NATIONAL MOTOR VEHICLE CO.
R-C-H CORPORATION
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CHASE MOTOR TRUCK CO.
DORRIS MOTOR CAR CO.
MERCER AUTOMOBILE CO.
WOODS MOTOR VEHICLE CO.
ABBOTT MOTOR CO.
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These manufacturers have earned a reputation for their cars only by the expenditure of thousands of dollars and long years of hard labor. They cannot afford to risk this hard-earned reputation by the use of inferior metals—injury to a few cars would destroy the reputation of their entire output.

The experience of over three-quarters of a century in building engines has enabled us to give to the automobile industry absolute perfection in these two bearing metals.

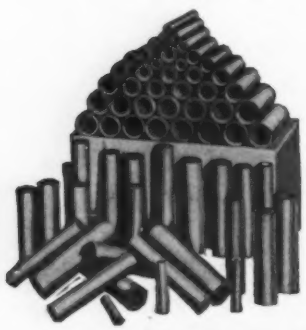
PARSONS' WHITE BRASS is used by these manufacturers in the main engine bearings and connecting rods, and CRAMP'S SPECIAL BEARING BRONZE in the wrist pin end of connecting rods, axle bearings, transmission gear bearings, etc.

PARSONS' WHITE BRASS is the most durable metal manufactured. It is the hardest and strongest Babbitt metal, having a higher melting point than any other Babbitt. Moreover, PARSONS' WHITE BRASS, having twice the elastic limit of any other Babbitt metal under compression, resists without injury to itself the explosion of the gasoline motor. Notwithstanding these durability qualities PARSONS' WHITE BRASS has never been known to score a crank shaft, a very valuable consideration when it is realized that a bearing costs a few cents while a crank shaft costs many dollars. The anti-friction qualities of our metal are unsurpassed. It gives extraordinary service because it has extraordinary qualities.

PARSONS' WHITE BRASS BEARINGS have been run for twenty years without material wear, in our marine engines, and there is a Packard car running in Philadelphia with the bearings untouched or unadjusted after seventy-five thousand miles of running.

In bearings where hard bronzes are required, CRAMP'S SPECIAL BEARING BRONZE should be used. Where the area is limited and the pressure is great, no bearing metal is equal to it. It has the quality of hardness, resisting wear and is of high elastic limit under compression resisting deformation.

Write for full particulars and list of automobile bearings for which these two metals are used.



For that break-down job we keep on hand a quantity of cored and solid bars furnished either in PARSONS' WHITE BRASS or CRAMP'S SPECIAL BEARING BRONZE.

ORDER BY TELEGRAPH

SHIP BY EXPRESS

Cored bars of all sizes given are kept in stock and solid bars up to 2" diameter. Sizes of bars not shown in the list and cored whole and half bushings with end collars can be furnished from our numerous stock patterns. Order by number in first column, stating which metal and whether cored or solid bars are wanted.

Cored Bars for Bushings

Number	Outside Dia.	Inside Dia.	Length
1	1 inch	1/2 inch	6 inches
2	1 1/4 "	1/2 "	6 "
3	1 1/2 "	3/4 "	6 "
4	1 3/4 "	3/4 "	12 "
5	1 3/4 "	1 "	12 "
6	2 "	1 "	12 "
7	2 "	1 1/4 "	12 "
8	2 1/4 "	1 "	12 "
9	2 1/4 "	1 1/4 "	12 "
10	2 1/2 "	1 1/4 "	12 "
11	2 1/2 "	1 1/2 "	12 "
12	2 3/4 "	1 1/2 "	12 "
13	2 3/4 "	1 3/4 "	12 "
14	3 "	2 "	12 "
15	3 "	2 1/4 "	12 "
16	3 1/4 "	2 1/4 "	12 "
17	3 1/4 "	2 1/2 "	12 "

Our guarantee of quality, uniformity and fair treatment is back of every casting sold

The William Cramp & Sons Ship and Engine Building Co.

PHILADELPHIA, PA.

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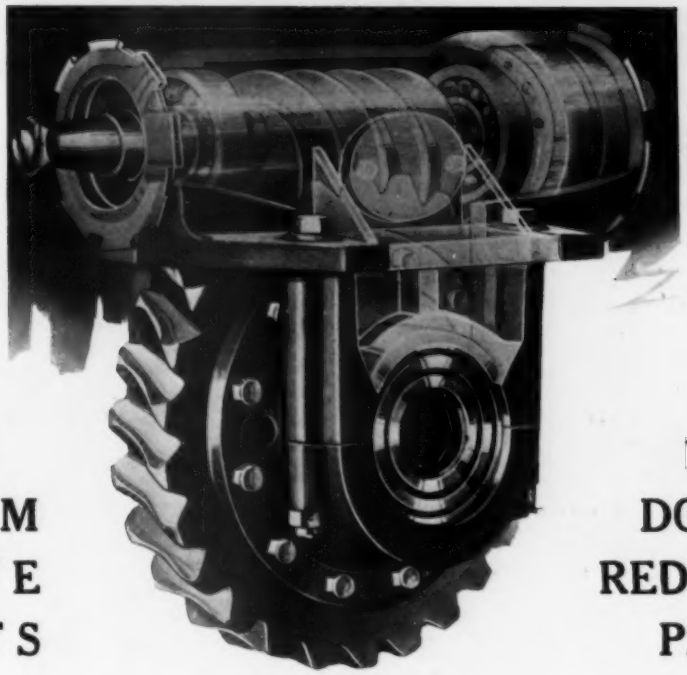
SHELDON
AXLES AND SPRINGS



606 WORM DRIVE PARTS

VS.

1866 DOUBLE REDUCTION PARTS

A CHAIN is no stronger than its weakest link. Every nut, cotter, washer, head pin casting, forging, chain link and rivet is a necessary unit of the assembly it composes. The failure of one of those units may mean the wreck of your truck, and perhaps the damage of property and the loss of life.

Only one-third the number of parts required for a Worm Drive that are required for a two-step reduction of the chain-driven type. This is convincing proof that, all things being equal, the single reduction Worm Drive has a three-to-one chance of giving better service than a two-step reduction with three times as many parts.

But all things are not equal. The Worm Drive is a single reduction, transmitting the power direct from the motor to the rear wheels. It is the only drive in which it is possible to secure this result.

The Worm Drive conserves power because it is a single reduction. Every moving power-transmitting unit works in oil, reducing friction to a minimum.

Sheldon Worm Drive is non-adjustable. The Worm carrier is machined exactly true by specially constructed machines.

If the carrier is not true, the Worm can not be assembled. Once assembled the Worm and Worm Wheel can be removed and replaced without disturbing their alignment. No adjustment to tamper with.

It is not necessary to provide adjustment for wear. The slight wear of the imported Worm and Worm Wheel only adds to its efficiency.

Of course, the Worm and Worm Wheel wears out, but not during the life of one truck. The experience of the largest user of Worm Drives has proven this.

SHELDON AXLE COMPANY, WILKES-BARRE, PA.

CHICAGO
68 E. 12th Street

SAN FRANCISCO
444 Market Street

DETROIT
1215 Woodward Avenue

Dependable Lamps for Motor Trucks

GAS ELECTRIC OIL

We manufacture a complete line of high-grade lamps for motor trucks—the "Indiana Line".

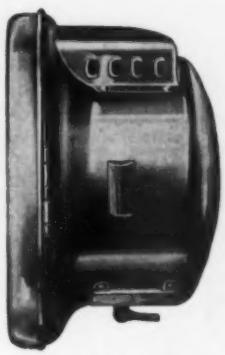
Lunar
Electric Headlight
"De Luxe"

All your lamp requirements can be filled from this line and no matter what type, size or character lamp you choose, you can feel assured that you are getting lamps of the highest quality of materials and workmanship and possessing extraordinary strength and stability, so desirable for motor trucks engaged in hard service.

The electric line is equipped with Ediswan Bayonet Sockets and Plugs and includes the following types:

Foreign Type—Large new 12 in. electric headlight of heavy-gauge brass, one-piece construction, heavy convex glass in front. Can be placed in close between radiator and fender.

De Luxe—New type close-coupled electric headlight of imposing appearance, balancing perfectly with new style of body construction. Can be focused to send thin pencil of light far ahead or diffuse rays to all sides of the road. Two sizes—8 and 10-inch flange.

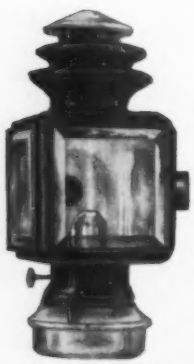


Lunar Gas Headlight

Flush or Convex Flange Dash Lamps, with white semaphore, plain white or frosted rosette. Also heavy-gauge electric tail lamp, with convex semaphore glass.

The Lunar Gas Headlight—Close-coupled type, is far superior to any medium-priced lamp on the market. Very compact, large diameter, short length. One-piece body, made of heavy-gauge material throughout and designed to stand the severest kind of usage. Gives brilliant light, easily cleaned, all parts interchangeable. Two sizes—8 and 10-inch flange. Has made a great hit with makers, dealers and users.

The Side and Tail Oil Lamps are very strong, substantial, attractive and dependable. Suitable for all types and sizes of cars. Have many exclusive features which make an unparalleled value. Are also made as combination oil and electric lamps by the addition of electric socket in body of lamp.



No. 22 Side Oil

Indiana Lamps cannot be excelled in quality or dependability. Their sturdiness and strength make them so desirable for use on trucks. Many leading makers are adopting them. Their prices are remarkably moderate for the quality. We make prompt shipments. Packed in individual cartons and labeled. Furnished in all black, black and brass or black and nickel, as desired. Send for illustrated literature.

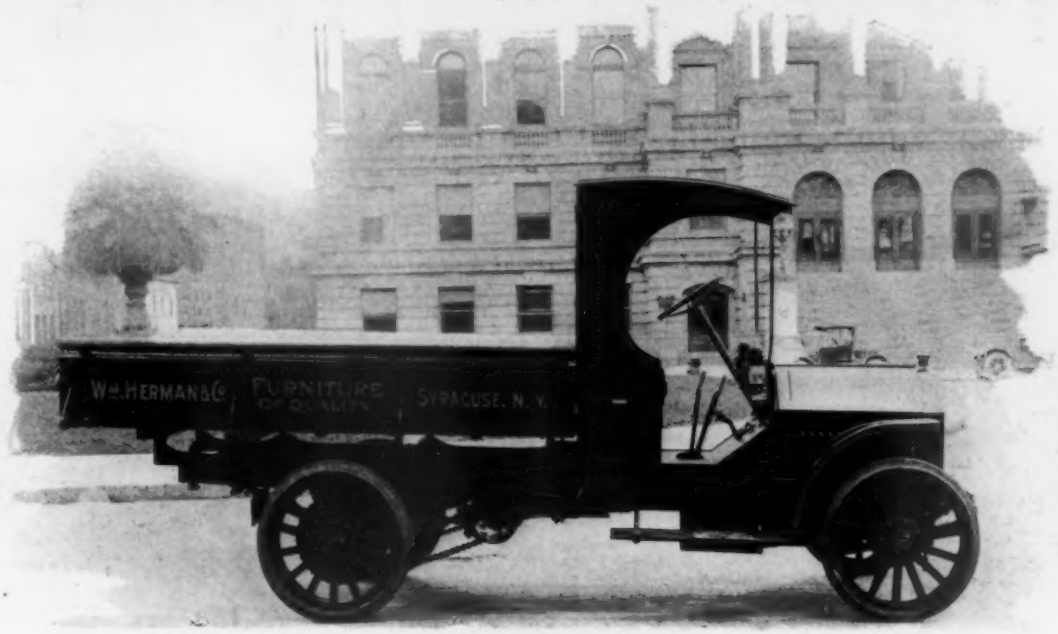
No. 26 Side Oil

Indiana Lamp Company

Connersville :: :: Indiana

REPUBLIC MEANS SERVICE

DEALERS—You Will Appreciate this Service as it Means Repeat Orders from Your Customers



Republic 2000 lb. Truck, Fitted With Express Body for Furniture Work

You have followed the trend in Truck design and noticed that the Trucks that are making good are the ones that are built of standard parts.

Each one of the units is built by a specialist in that line and backed by the name and prestige of the part maker.

Study the specifications of the Rupublic. Go over it part by part with any of the leading 1 or 1½ ton trucks. You will be agreeably surprised to learn that many of the units are identical with those used on the larger and higher priced trucks.

The use of these strong and reliable parts insures you and your customers against replacements due to defective material.

We are looking for a few more wide-awake dealers who realize the wonderful opportunity that is offered them in this exceptional Truck. We have a selling plan that will make you money. Get in touch with us at once and let us show the facts of our proposition.

SPECIFICATIONS:

Continental Motor	Hyatt Roller Bearings	Covert Transmission
Schebler Carburetor	Hartford Joints and Clutch	Lewis Springs
Eisemann Magneto	Culver-Taylor Chains	Left-Hand Drive
Russel Jack Shaft		Center Control

Capacity, 2000 lbs. **Body, Stake or Express.** **Price, $1425**

ALMA MOTOR TRUCK CO.

Factory, Alma, Mich. General Sales Office, 870 Woodward Ave., Detroit, Mich.

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SERVICE STATIONS: 5129 Evanston Ave., Chicago, Ill.; Pico & Hill Sts., Los Angeles, Cal.; 571-77 S. Clinton St., Syracuse, N. Y.; Mignonette & Beatty Sts., Pittsburgh, Pa.; 215 W. 4th St., Columbus, Ohio.

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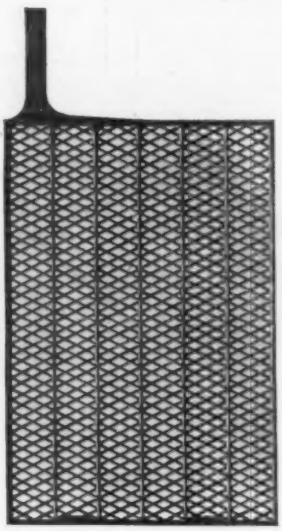
THIN PLATE BATTERIES
ARE BEING INSTALLED IN



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OF ALL THE ELECTRIC VEHICLES
[BOTH PLEASURE AND COMMERCIAL]
BEING PRODUCED TODAY

DIAMOND GRID TRADE MARK

PHILADELPHIA STORAGE BATTERY COMPANY

"Originators of the THIN PLATE"

ONTARIO AND C STREETS PHILADELPHIA

AGENCIES AND DEPOTS EVERYWHERE

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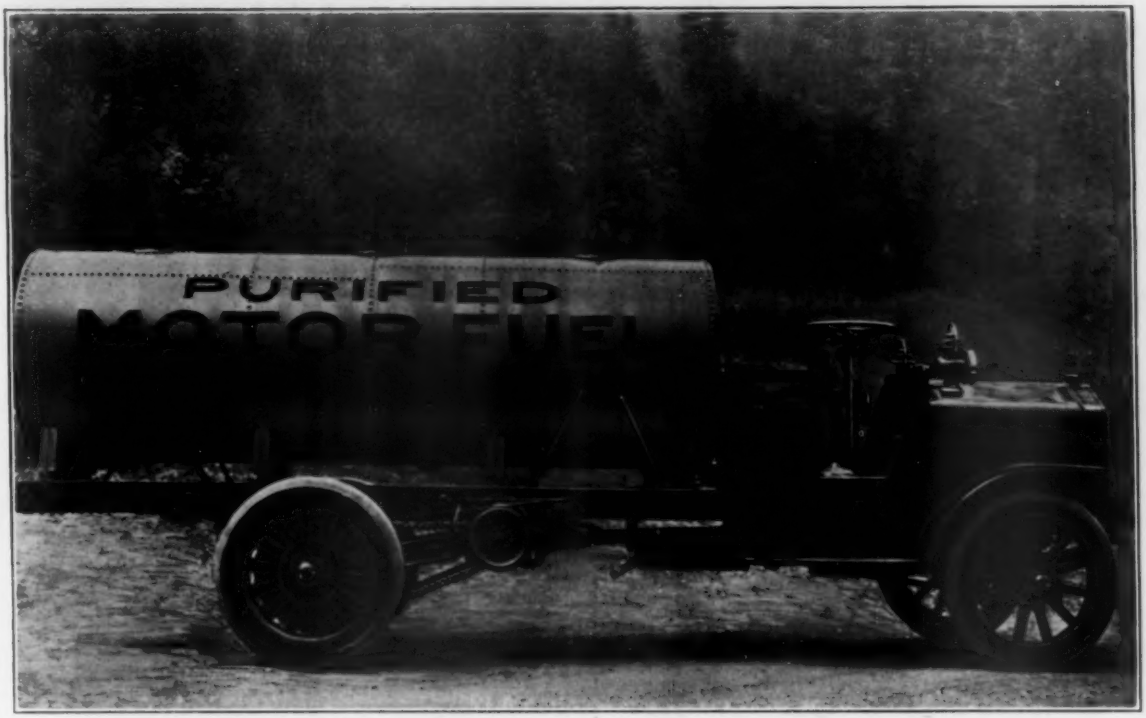


IN THE OIL SERVICE, CASCADE MOUNTAINS OF OREGON

Standard 3-TON TRUCK

Is made entirely of parts which are **the** accepted as standard over the entire world. There are no "Features," "New Ideas," or "Improved Theories." **Just standard in every detail.**

CHASSIS
$2750.00
F.O.B. DETROIT

"Fitting the Truck to the Service"

The "Standard" Truck is built in twelve different lengths of loading space, ranging from eight to twenty-two feet, with five different lengths of wheel base. This range of sizes adapts the "Standard" Truck to **any** type of service.

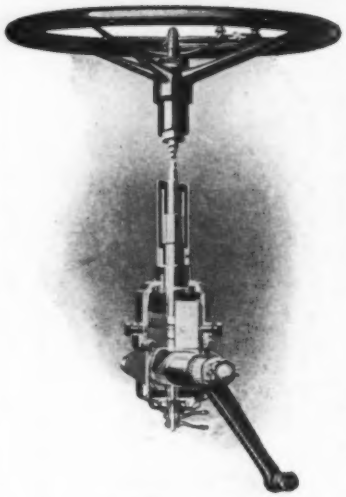
We can furnish an option of eight different gear ratios to take care of road conditions in any locality.

We want Responsible Dealers in such territory as remains unoccupied. *Write us today.*

STANDARD MOTOR TRUCK CO.
Detroit, Mich

1909 1913

PIONEER
TRUCK STEERING GEAR MFRS.



We make more steering gears for commercial vehicles than any other manufacturer.

We furnish our gears with drag links.

Standard For:—Commercial Cars, Trucks, Tractors, and High-Grade Pleasure Cars.

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THE LAVIGNE GEAR CO.
STATION A **RACINE, WIS.**

Steel Tanks

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Our extensive manufacturing facilities enable us to meet **your every requirement.**

111 years old. **Founded 1802**

Wm. B. Scaife & Sons Co.
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Send also for catalog of
GASOLENE STORAGE OUTFITS

3-Gallon Approved Extinguisher

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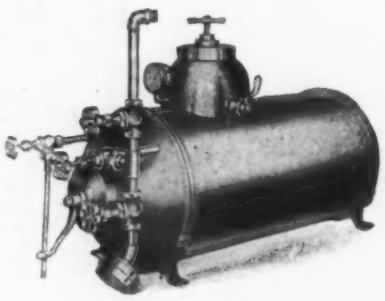
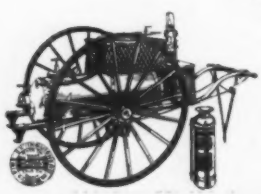
of every description for department apparatus. We are equipped to make tanks of any size or type.

We also provide a complete line of Chemical Engines, mounted on wheels for service in factories, towns, villages, etc. Hose Reels, Hose Axles, Ladders, Hooks, etc.



35-Gallon Copper Tank



We can equip any chassis complete with body, chemical apparatus, etc. ***Ask us.***

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USED IN CONJUNCTION WITH ANY CARBURETOR WILL

Reduce Gasoline Bills 25% to 40%

It thoroughly mixes the gasoline so that its full power-producing qualities can be utilized, giving increased power, particularly at low speed and on heavily loaded vehicles.

Price, $5.00

Mondex Shock Preventer

A device that absolutely controls the action of the springs by graduated compression of rubber. Heavy shock meets with much resistance, light shock with light resistance.

Made for light and heavy cars

Mondex Polish for automobile bodies and all varnished surfaces. Dries instantly, leaving a brilliant lustre. Free sample on request. Agents wanted everywhere.

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RELIANCE AUTOMOBILE CO., San Francisco, Cal.
Agents for Pacific Coast

SCHWARZ
--WHEELS--

Safety Insurance

A motor vehicle, whether pleasure car or truck, equipped with SCHWARZ WHEELS, carries a paid-up policy of insurance against wheel troubles.

SCHWARZ WHEELS are not just ordinary wheels adapted to automobile use, but are a distinctive product made particularly for automobiles, after study and experiment had shown both the weaknesses of the ordinary wheel and the way to correct these weaknesses.

Spokes dovetailed and interlocking, forming a rigid immovable center assemblage which cannot loosen, get out of shape or run out of true, correct definitely the annoying wheel difficulties, which had before been accepted as inevitable.

SCHWARZ WHEELS, which are the only wheels that can be made on this principle, give the maximum of safety, strength and endurance and positively insure safe and comfortable riding and freedom from wheel dangers.

The leading motor vehicles, both pleasure and commercial, are SCHWARZ - equipped, because SCHWARZ WHEELS are standard for quality, safety and economy. Look well to the wheels. Are your cars equipped with just wheels, or a modern safety-insured SCHWARZ product?

Write for descriptive matter

The Schwarz Wheel Co.

Frankford, Philadelphia, Pennsylvania

Seamless Steel Products

Brake Drums

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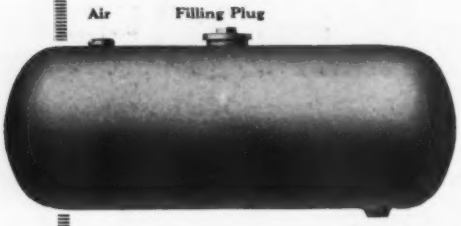
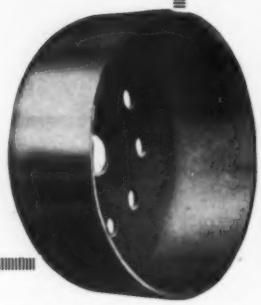


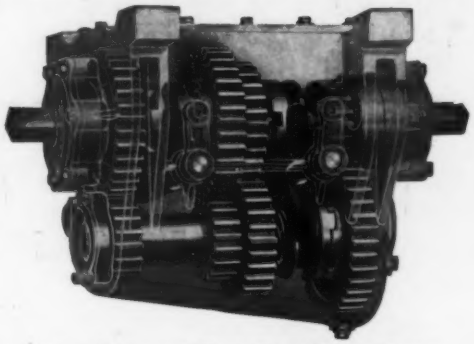
Heavy Flanges, etc.

Any Diameter, Gauge or Height



Federal Pressed Steel Co.
Milwaukee : Wisconsin

COTTA TRANSMISSIONS



Internal View of Shaft-Drive Transmission, designed for use in worm-drive trucks

For Heavy Truck and Tractor Service

Eliminate Transmission Trouble

Selective type, individual clutch system. All gears always in mesh. Countershaft and mainshaft gears idle on direct. Improved speed-changing device. No plain bearings —loose gears mounted on roller bearings.

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is the logical paper for every man to read who contemplates buying or selling commercial motor cars.

It is brimful of essential information.

The Commercial Car Owner will also find many suggestions in it that will make his driving more efficient.

Send for a sample copy.

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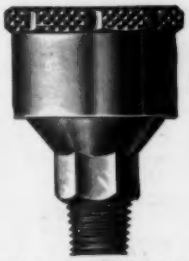

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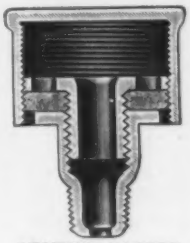
BRASS AND STEEL

GREASE AND OIL CUPS

WE MANUFACTURE

a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.



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AUBURN, N. Y.

MERCURY TRUCKS

"They deliver goods at less expense than anything else on wheels"

This Model complete with Wood Panel,
$870

With Canvas Panel,
$850
F. O. B. Chicago

We want dealers to handle
MERCURY TRUCKS
Send for Literature and Proposition.

MERCURY OWNERS
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MERCURY TRUCKS

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6 to 8 Days' Time Saved

In the painting of every vehicle you turn out.
How much will that be worth to you in a year?
At least ⅓ the paint shop labor saved.
How much will **that** net you?

Valentine's Celox Rapid System

will finish a vehicle from the wood or metal up, in 4 to 7 days.

It is a Valentine system in every sense, thoroughly practical, easy of application, and producing a handsome and durable finish.

It is in use in many factories and hundreds of repair shops.

We are prepared to make a demonstration of the Celox Rapid System in any factory—or to send the material for a complete try-out at our own risk.

Write for try-out offer

Valentine & Company

456 Fourth Avenue NEW YORK | 343 S. Dearborn Street CHICAGO | 74 Pearl Street BOSTON

Budd ALL STEEL Bodies

represent the last word in the art of truck body building. They stand for strength, stability, sturdiness and efficiency. Made entirely of steel, they will not rot or crack. They cannot warp or split. They will stand the maximum use or abuse and are practically indestructible. They eliminate fire risk. They are light in weight and easy on tires—pleasing in design and attractive. Summed up in a word, they give the highest degree of Service.

They are made in many styles—of any desired capacity. Estimates promptly furnished. Write us today for full information.

Edward G. Budd Manufacturing Co.
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Detroit Office and Showroom, 796 Woodward Ave.

Hayes Wheels

Our motor truck department is equipped with the latest improved and specially designed machinery, and with an experienced, capable organization, to turn out the best wheels ever made for motor trucks.

Hayes quality is known from ocean to ocean. **Hayes Wheels** are used, among others, by these leading automobile and truck manufacturers:

Studebaker	Standard Motor Truck
Detroit Electric	Federal
Garford	Speedwell
Imperial	Cadillac
General Motors Truck	Sandow
Brown Commercial Car	Gramm
Chalmers	Woods
Columbia	Moon
Maxwell	Regal
Rambler	Packard
Overland	Mogul
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SUBMIT YOUR SPECIFICATIONS TO US FOR QUOTATIONS

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ONE TON TRUCK $750.

24 H. P. Bosch Magneto 2-in. Axles 36 in. Demountable Tires

Ten Stock Body Types

DEALERS: Do you want BIG PROFITS from a SMALL INVESTMENT? Write for details

H. J. KOEHLER S. G. COMPANY
1709 BROADWAY, NEW YORK

PALMER

The Standardized Truck

2000-pound 3000-pound

The Palmer is a **dependable** and **serviceable unit** constructed from the best individual parts manufactured.

Features include Continental motor, Timken front and rear axle, jack shaft and differential, Bosch high-tension magneto, Warner steering gear and transmission, Stromberg carburetor, honeycomb radiator, Firestone tires, left-hand drive, center control.

Palmer 2000-pound, $1600; Palmer 3000 pound carrying capacity up to 2 tons, $1975.

WE want dealers—a limited number of wide-awake, energetic dealers—to handle this general utility truck line. Write today for literature and selling proposition.

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World's largest Manufacturers of Ignition

THE best authorities agree that your truck investment will not be profitable unless the service is continuous. The one and only way to guarantee continuous service is to guarantee 100% efficient ignition with the famous Remy Magneto.

Remy Electric Company

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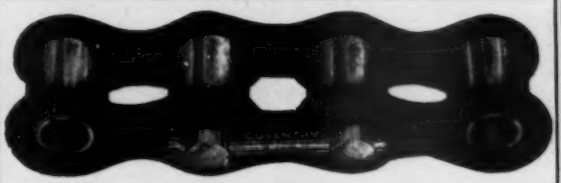
Service Stations Throughout the Country

KELLY

Kelly trucks are built right from every point of view. Their design is the result of seven years' study of the evolution of the successful commercial car. Only the best material and skilled workmanship are used. They are built in two models—1½ and 3 tons.

The Kelly-Springfield Motor Truck Co.
SPRINGFIELD OHIO



"The Coventry"
Detachable Roller Chain

Note the large heavy-duty cotter-pin connecting the two rivets. The mechanical superiority of this method of coupling can easily be appreciated. Vibrations and jars cannot weaken the double-size coupling as is the case where two smaller cotter-pins, one for each rivet are employed.

Combine the established reputation of "The Coventry" Chains for precision, perfect retention of pitch and unparalleled durability with this final touch of perfection and you will understand why "The Coventry" Chains are consistently specified by those desiring the maximum of transmission efficiency.

Our catalog comprehensively covers "The Coventry" line, and will be sent immediately upon request.

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Dept. V 116 Broad Street New York

THE RUTENBER MOTOR

Manufactured since 1901 for high-grade

Automobiles
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Trucks

3¾ x 5½ four and six cylinder
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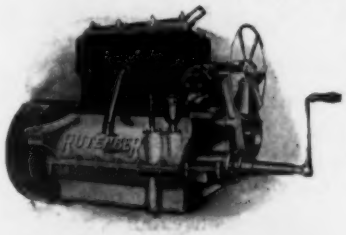
Standard or Unit
and
4 x 4, 4½ x 5 and 4¾ x 5 Standard Types
All L-Head, 4-Cycle



Manufacturers are invited to investigate our service and our facilities. Literature on request.

The Rutenber Motor Company
MARION, INDIANA

Unity of interest means unity of effort

The owners, the board of directors and the executive officers of the Pierce-Arrow Motor Car Company are one and the same group of men. The

Pierce-Arrow

organization is, and has always been, one of united individuality, one entirely free from outside interference by syndicates or any other form of external control

The Pierce-Arrow Motor Car Company builds nothing but motor cars, thinks nothing but motor cars, and all its surplus strength and energy are used to make its good motor cars better

The Pierce-Arrow Motor Car Company of Buffalo, N.Y.

Hayes Wheels

Our motor truck department is equipped with the latest improved and specially designed machinery, and with an experienced, capable organization, to turn out the best wheels ever made for motor trucks.

Hayes quality is known from ocean to ocean. **Hayes Wheels** are used, among others, by these leading automobile and truck manufacturers:

Studebaker	Standard Motor Truck
Detroit Electric	Federal
Garford	Speedwell
Imperial	Cadillac
General Motors Truck	Sandow
Brown Commercial Car	Gramm
Chalmers	Woods
Columbia	Moon
Maxwell	Regal
Rambler	Packard
Overland	Mogul
Jackson	Elkhart

SUBMIT YOUR SPECIFICATIONS TO US FOR QUOTATIONS

HAYES WHEEL CO. :: Jackson, Mich.

KOEHLER

ONE TON TRUCK $750.

24 H. P. Bosch Magneto 2-in. Axles 36 in. Demountable Tires

Ten Stock Body Types

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H. J. KOEHLER S. G. COMPANY
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The Palmer is a **dependable** and **serviceable unit** constructed from the best individual parts manufactured.

Features include Continental motor, Timken front and rear axle, jack shaft and differential, Bosch high-tension magneto, Warner steering gear and transmission, Stromberg carburetor, honeycomb radiator, Firestone tires, left-hand drive, center control.

Palmer 2000-pound, $1600; Palmer 3000 pound carrying capacity up to 2 tons, $1975.

WE want dealers—a limited number of wide-awake, energetic dealers—to handle this general utility truck line. Write today for literature and selling proposition.

PALMER-MEYER MOTOR CAR CO.
5027 McKissock Avenue, St. Louis, Mo.

REMY

World's largest Manufacturers of Ignition

THE best authorities agree that your truck investment will not be profitable unless the service is continuous. The one and only way to guarantee continuous service is to guarantee 100% efficient ignition with the famous Remy Magneto.

Remy Electric Company

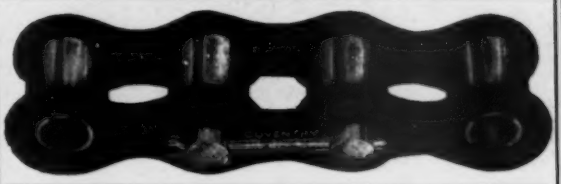
Anderson, Indiana

Service Stations Throughout the Country

KELLY

Kelly trucks are built right from every point of view. Their design is the result of seven years' study of the evolution of the successful commercial car. Only the best material and skilled workmanship are used. They are built in two models—1½ and 3 tons.

The Kelly-Springfield Motor Truck Co.
SPRINGFIELD OHIO



"The Coventry" Detachable Roller Chain

Note the large heavy-duty cotter-pin connecting the two rivets. The mechanical superiority of this method of coupling can easily be appreciated. Vibrations and jars cannot weaken the double-size coupling as is the case where two smaller cotter-pins, one for each rivet are employed.

Combine the established reputation of "The Coventry" Chains for precision, perfect retention of pitch and unparalleled durability with this final touch of perfection and you will understand why "The Coventry" Chains are consistently specified by those desiring the maximum of transmission efficiency.

Our catalog comprehensively covers "The Coventry" line, and will be sent immediately upon request.

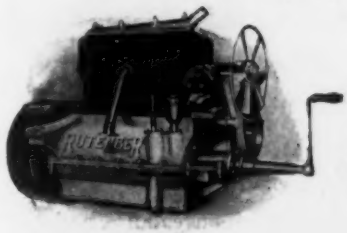
Herbert F. L. Funke Co., Inc.
Dept. V 116 Broad Street New York

THE RUTENBER MOTOR

Manufactured since 1901 for high-grade

Automobiles and Trucks

3¾ x 5¼ four and six cylinder
4¼ x 5¼ four and six cylinder
Standard or Unit
and
4 x 4, 4½ x 5 and 4¾ x 5 Standard Types
All L-Head, 4-Cycle



Manufacturers are invited to investigate our service and our facilities. Literature on request.

The Rutenber Motor Company
MARION, INDIANA

Unity of interest means unity of effort

The owners, the board of directors and the executive officers of the Pierce-Arrow Motor Car Company are one and the same group of men. The

Pierce-Arrow

organization is, and has always been, one of united individuality, one entirely free from outside interference by syndicates or any other form of external control

The Pierce-Arrow Motor Car Company builds nothing but motor cars, thinks nothing but motor cars, and all its surplus strength and energy are used to make its good motor cars better

The Pierce-Arrow Motor Car Company of Buffalo, N.Y.

BOLLEE LAUTH-JUERGENS RANDOLPH SEAGRAVE KISSEL GRAND RAPIDS SCHNEIDER KINNEAR PEERLESS RENAULT

ADLERWERKE

BALL BEARINGS

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"INSURANCE FOR BUILDER AND USER"

RHINELAND MACHINE WORKS CO

140 WEST 42nd ST. NEW YORK, N.Y.

GEBRUDER STOEWER ARIES KELLY NAGANT PANHARD PEUGEOT DELAHAYE MACK DE DIETRICH AUTO-METALLURGIQUE

Spicer

Universal Joints

For Commercial and Pleasure Motor Cars

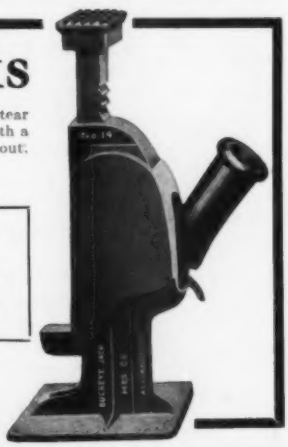
Consult our representatives:

K. Franklin Peterson, 122 S. Michigan Blvd., Chicago
Thomas J. Wetzel . 17 West 42nd Street, New York
L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit

Foreign Representative: BENJAMIN WHITTAKER, 21 State St., New York

SPICER MFG. CO. - - PLAINFIELD, N. J.

BUCKEYE Motor Truck Jacks



Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼"	6½"	18"	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼"	7½"	20½"	26½ "	3 "		15.00
14	14¼"	7½"	20½"	33 "	5 "		16.00
9	11½"	6"	17½"	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio

Chilton Advertising Post Cards

in colors should be included in every advertising campaign

Your prospective customer *may* see your catalog or magazine advertisement, but he is sure to read your CHILTON POST CARD.

The use of the post card in colors is the modern way to advertise and economize. It is a *personal-appeal* form of publicity which invariably attracts attention, and is sure to land orders.

Forward us your printed matter, state what you want to advertise and how many cards you can use, and we will do the rest.

CHILTON COMPANY, Market and 49th Streets, Philadelphia, Pa.

Ford
THE UNIVERSAL CAR

If you were all mind from your toes up, you couldn't remember half the good things you've heard of the Ford. It's the most talked of car of the day. And sterling merit has made it popular the world over.

Five hundred dollars is the new price of the Ford runabout; the touring car is five fifty; the town car seven fifty—all f. o. b. Detroit, complete with equipment. Get catalog and particulars from Ford Motor Company, Detroit.

AIR FILLING PLUG
SEAMLESS STEEL
TANKS
TINNED & TESTED
JANNEY, STEINMETZ & Co-PHILA.
GASOLINE

This is the
"Jasco Tank"

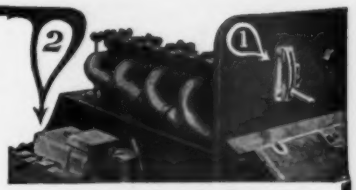
¶ It is made absolutely seamless and leakless, of drawn steel, thoroughly tinned and tested. It is

THE SAFETY GASOLENE RECEPTACLE FOR THE AUTO

¶ It not only insures the safety of the car and its occupants, but stops the constant drain on pocketbooks caused by waste of gasolene. Made in all standard styles and sizes.

JANNEY, STEINMETZ & COMPANY
MAIN OFFICE: PHILADELPHIA, PA.
NEW YORK OFFICE: HUDSON TERMINAL BLDG.

Make your motor truck as easy to handle and as economical in upkeep as a pleasure car, by installing



SIMPLE—STURDY—ACCESSIBLE

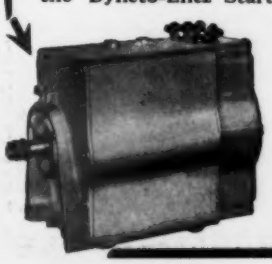
Dyneto-Entz
TRADE MARK

Electric Starter and Lighting System

Don't expect your driver to break his back cranking a big engine. He would rather let the motor run from morning till night. **You pay for gasoline—he doesn't.** When your truck stalls on the road or in traffic, think of the time it takes the driver to get under way again.

Give Your Truck Driver the Dyneto-Entz Starter

The truck manufacturer can make room on any new car for the Dyneto-Entz. On an old car a garageman or mechanic can find room for the Dyneto-Entz. One Switch does away with all other controls. A single unit motor generator not only starts the engine every time, but keeps the storage battery charged. The storage battery can not be overcharged. The wiring is simple.



The Dyneto-Entz means that you never have a Stalled Car. Standard Equipment on Franklin, White, Tribune, Stewart, Chase and Other Cars.

Write for Full Particulars

Dyneto Electric Co.
Dept. M SYRACUSE, N. Y.
Sales Agent: T. J. WETZEL, 17 W. 42nd Street, New York City

This is the Way to Haul

You can haul cheaper, easier and quicker with an Avery Truck than you can with horses.

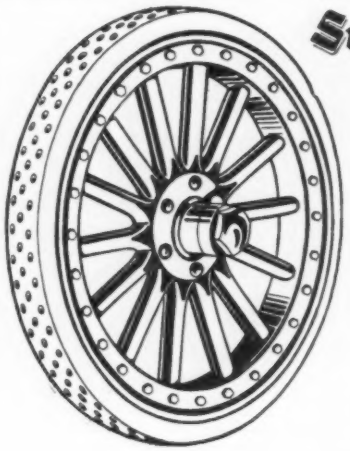
In one month we received 36 testimonial letters from satisfied users of Avery trucks. Each one of these gave proof that the Avery Truck was a money-saving proposition, both for hauling loads in the city and for overland and country hauling. Because of its ability to haul the big loads and do the big things, we call it

"The Truck that Does the Most Work."

The Avery Truck is built in all sizes from 1 to 5 tons capacity. Also in three types, "A," "B" and "C" with seats at the side of the motor, over the motor and behind the motor.

There is an Avery Truck for any kind of work. They are now used in over a hundred lines of trade. Get the new Avery Truck book. Address

THE AVERY COMPANY, 950 Iowa St., Peoria, Ill.



Swinehart

Cellular Truck Tires

Most resilient solid tire made. Absolutely non-skid. Increases traction and eliminates undesirable slipping and friction. Does away with the use of chains. The holes in the tire act as a radiator, preventing excessive heating and internal friction. The extra large surface of the Swinehart tread reduces the pressure per square inch to a point well within the safe and economical limit.

The wonderful elasticity, due to the combined use of our cellular design and the highest grade of rubber, allowing the tire to "give and take," to stand the road shocks without damage, is the true secret of Swinehart longevity. Demountable Quick Attachable.

We also make a full line of smooth tread and block tires, single and dual.

THE SWINEHART TIRE & RUBBER CO.
AKRON, OHIO
Boston Branch, 727 Boylston Street

3 BIG FACTS YOU SHOULD KNOW
about the Republic Steel Base Motor Truck Tire: 1, that this tire holds securely to the rim and cannot creep, because it is keyed on under high pressure; 2, that you can run it clear down to the hard rubber counterbase without causing chunks of the rubber tread to tear out; 3, that only external road-wear can affect it.
These three features make this motor truck tire more economical and efficient than any other style of tire. Let us give you the full facts and figure on your requirements.
THE REPUBLIC RUBBER CO., YOUNGSTOWN OHIO
BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES
REPUBLIC
STEEL BASE
MOTOR TRUCK TIRE

ROSS
STEERING and DIFFERENTIAL
GEARS
are standard on good motor truck construction

WRITE FOR CATALOG

ROSS GEAR & TOOL CO.
790 Heath St. :: Lafayette, Ind.

B. A. Gramm's Motor Trucks

Newest Designs, Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

The Gramm-Bernstein Co.
Exclusive Motor Truck Builders
Lima, Ohio, U. S. A.

Motor Truck Bands

MADE WITHIN THE FOLLOWING

Dimensional Tolerances

(ADOPTED BY THE SOCIETY OF AUTOMOBILE ENG.)

1.—Tolerance in circumference of felloe band:

	Plus	Minus
Before application to wheel - -	1-32″	1-32″
After " " " - -	1-16″	1-32″

Variation from precise measurement shall be uniform over entire width of band.

2.—Tolerance in width of felloe band:

	Plus	Minus
Up to and including 4″ - - -	1-32″	1-32″
4—1-16″ to 6″ - - - - -	3-64″	3-64″
6—1-16″ to 12″ - - - - -	1-16″	1-16″

3.—Variation in trueness of band when placed on surface plate: Band shall touch at all points within 1-32″ up to and including 6″ width. Over 6″ width within 1-16″.

4.—Variation in thickness of band: .006″ plus or minus.

5.—Trueness to round. The radial tolerance on the wheel when felloe band is applied shall be 1-16″ plus or minus. This plus or minus tolerance must not occur at diametrically opposite points. There shall be no flat spots or kinks in felloe band on the finished wheel.

The Standard Welding Company
CLEVELAND
NEW YORK CHICAGO DETROIT

GOODYEAR
AKRON, OHIO

Motor Truck Tires

We make, to supply an immense trade, seven types of motor truck tires—a tire for every service.

Under certain conditions you want **block** tires on rear wheels. Note in Goodyear Block Tires, **each block has its own, individual fastening.** Thus you can remove a single block without disturbing a half dozen others—or more.

We make a Solid Demountable Tire which is not only marvelously easy to **remove,** but which **can't creep.** This is accomplished by our split ring which automatically adjusts to all irregularities in tire or rims. Has hard metal sub-base, hard rubber base, soft rubber tread. All perfectly unionized. Thus we secure unusual wear at base as well as tread.

The Goodyear Side Flange Quick Detachable is a solid tire for trucks up to two tons. The ever occurring problem of preventing creeping has been completely solved by means of diagonal cross wires in the base. It is never necessary to shellac this tire to the rim.

Our seven Truck Tires are illustrated and completely described in our Motor Truck Tire Catalog.

The Goodyear Tire & Rubber Co.
AKRON, OHIO
Toronto, Canada London, England Mexico City, Mexico
Branches and Agencies in 103 Principal cities.
Write us on Anything you Want in Rubber.

ROWE MOTOR TRUCKS

are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five ton capacity

Rowe Motor Manufacturing Co.
Coatesville, Pa.

USE KEROSENE

CUT YOUR FUEL EXPENSE IN HALF

WITH THE

G. C. VAPORIZER

It **runs any motor on kerosene** and the cheaper fuels **better** than on gasoline, and operates **without carbon, odor** or **smoke.**

Every truck owner and user should learn all about this extraordinary motor improvement by sending for our booklet,

"Use Kerosene as Fuel"

G. C. Vaporizer Company of America, Inc.
1790 BROADWAY NEW YORK

"BEST"

1000 to 1250 lbs. Capacity

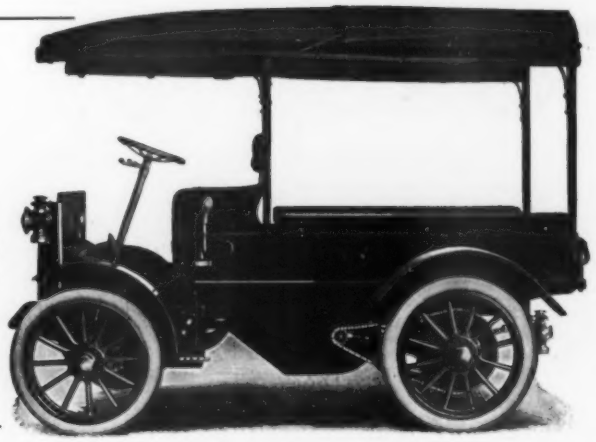
42" x 72" Loading Space

Price, with Top, Pneumatic Tires } $890.00

FLINT MOTOR WAGON DEPT.

DURANT-DORT CARRIAGE CO.

FLINT, MICH.



Model "B" 2-Ton

Chassis $2100

WICHITA TRUCKS

1 and 2 Ton Capacities

Dealers: Write or wire us for sales proposition, territory is being snapped up rapidly.

Wichita Falls Motor Company

WICHITA FALLS, TEXAS

Model "A" 1-Ton

Chassis $1650

Motor Truck Bodies

Special bodies designed and built on contract for qauntities.

Our Engineering Department is at your service. Let us submit designs and estimates.

The Highland Body Mfg. Co., Cincinnati, O.

KING 3½ Ton Truck

There is no question as to the quality and efficiency of the King. This means low cost of maintenance. If you want a truck that will do real work and stay on the road, it will pay to investigate.

We can give you the service

Territory for reliable agents

A. R. KING MANUFACTURING CO., Kingston, N. Y.

COVERT

THE PROVEN TRANSMISSION

14 Years of Satisfaction

Years of unequaled service to users of Covert Transmissions has proven the superiority of Covert construction.

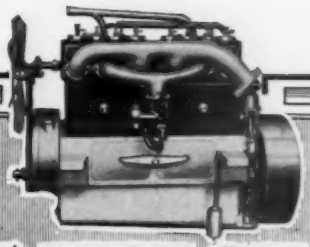
Designed right—built right—by men who know.

Made in sizes suitable for commercial vehicles from 500 lbs. to 10,000 lbs. capacity.

Covert Motor Vehicle Co.

SALES OFFICE
Detroit, Mich.

FACTORY
Lockport, N. Y.



WAUKESHA

4¼×6¾ LONG STROKE TRUCK MOTOR

THE Waukesha Long Stroke Truck Motor is designed solely to meet the requirements of truck service and so solves with maximum efficiency the truck user's delivery problem.

It is the truck manufacturer's strongest justification for re-orders. Its positive, definite, unvarying efficiency under all working conditions gives the purchaser of the first truck a totally new idea in truck service that makes your hold on his future truck requirements a foregone conclusion.

Exclusive processes in metals used give the Waukesha strength unapproached by any other motor. The crankshaft has a tensile strength of 140,000 lbs. to the square inch. The bearings have greater resistance than the best Parsons' White Brass. The unusual strength of these two features is but an index to the character of the motor as a whole.

As a progressive manufacturer of trucks you should at least know all about the Waukesha. Your request will bring full information.

WAUKESHA MOTOR CO.
WAUKESHA Dept. A. WISCONSIN

AN EXCEPTIONAL MOTOR

The demand for bearings that will not crush under load has given HYATT ROLLER BEARINGS a big lead over all other types.

The flexible principle is a thoroughly tested feature and enables the bearing to withstand sudden shocks and strains and meet successfully the conditions encountered in automobile construction.

Perfect lubrication is made possible by the right and left spirals which distribute the oil evenly over the entire surface of the bearing. Grit and dirt are positively arrested and carried to the inside of the roller. These features insure long life to the bearings.

Our Engineering Department will be glad to go over your plans with you.

Hyatt Roller Bearing Company
Detroit, Michigan

Tire Economy Alone Would Make the Palmer-Moore Truck a Good Buy

On the basis of guaranteed mileage, pneumatic tires cost, on an ordinary truck of average capacity, from **five to twelve cents per mile more** than solid tires. Yet most truck makers furnish solid tires only when compelled to do so, and then withdraw their guarantee because solid tires show up the weak points in construction if weakness exists.

On the Palmer-Moore Truck, solid tires are **standard equipment. Why not save the five or more cents per mile?**

Anybody that can load a Palmer-Moore Truck can operate it. One lever on the steering wheel controls the engine and no amount of careless shifting can throw the gears into low or reverse when the high-speed gear is in. There is no radiator to look after, no valves or adjustable engine parts to get out of order, no tire accidents to fear, and engine lubrication requires only mixing a quart of oil with every five gallons of gasoline put into the tank.

Aren't such features worth your further investigation?

PALMER-MOORE COMPANY, Syracuse, N.Y.

"Reliable Springs are More important on Commercial Cars than on Pleasure Cars."

THE PERFECTION SPRING CO.

Cleveland - - - - - Ohio

The Device That Makes The Profitable Motor Truck Possible

The real point in figuring the cost of Motor Truck operation—and for that matter the cost of operating horse wagons—is WASTED TIME. Time lost on the road—time lost at loading and unloading stations—lost time which amounts to far more than the combined waste of tires, gas, oil, repairs and depreciation. It is impossible to secure, by human supervision alone, accurate data on the movements of vehicles. Checking sheets and cost-keeping systems may show some of the loss, but they do not go far enough—they miss that vital and expensive item "WASTED TIME."

THE SERVIS RECORDER deals only with time—It gives an accurate, tamper-proof record of every movement of the vehicle during every minute of the 24 hours—It gives mechanical supervision, accurate and impartial—It plays no favorites—It prevents any unlicensed use of vehicles—It works equally well on motor trucks, horse-drawn wagons, or sleighs—It has no gears, shaft, or outside connections of any kind—It can be attached to any vehicle in ten minutes.

THE SERVIS RECORDER will demonstrate whether horse wagons or motor trucks are the most profitable for any particular line of work, and often will show, how the same work can be performed with less equipment.

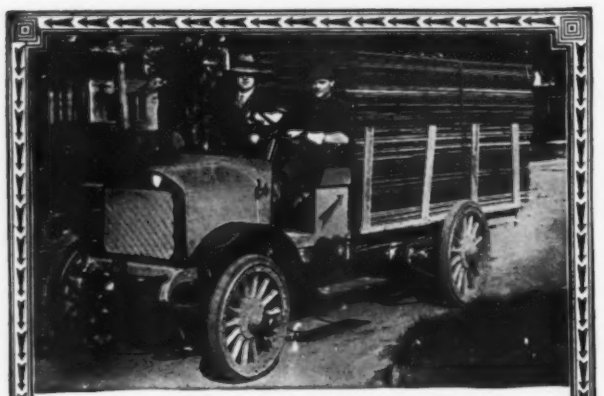
THE SERVIS RECORDER is in use by firms and individuals in more than 50 lines of business, in 43 cities, and by 56 railroads, for use in switching locomotives.

How the Servis Recorder operates—the economy it will effect—the improvements it will produce in delivery service—the experience of its owners, will be told without obligation.

The Service Recorder Co.

2431 E. 105th St., Cleveland, O.

Branches in Twenty Cities



A Substantial 3000-lb. Truck For $1775

The above illustration portrays a model C Dart Truck of 3000 lbs. capacity—the truck that has startled the motor truck world because of its low price and superb construction. $1775 for chassis, driver's seat, tools, etc. Body extra. 40 H. P. 4 cylinders. 4 1-16 inches x 5½ inches. Tires guaranteed 8000 miles. Eisemann magneto. Left hand drive. Differential and tranmission of chrome nickel steel.

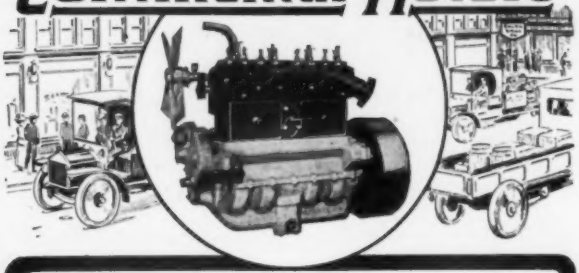
Dart Motor Trucks

Model E. D., 2 cyl., $750—Model B., 4 cyl., $1200—Model C., $1775.

The Canfield Lumber Co. is successfully operating Dart Trucks at its Waterloo and Cedar Rapids Yards. Dart Trucks are in use throughout the country, and every user will tell you of their low cost of upkeep and exceptionally good service. Write today for catalog and name of dealer.

The Dart Motor Manufacturing Company
Dept. "C J" Waterloo, Iowa

Continental Motors



A Mighty Power in the Motor Truck Field

75,000 Continental Motors develop 3,000,000 H. P. daily

This tremendous cataract of Continental power is doing a large share of the world's work. In the market place, over crowded city thoroughfares, upon the highways and byways of the open country, in the freight yards — everywhere — it propels great loads of merchandise with sureness and dispatch.

And more. This famous motor is selling the trucks that bear it, is bringing profit to user, dealer and maker, and is building up many commercial car reputations of merit.

Tap this tremendous force of power for your trucks — use Continental energy.

Continental Motor Mfg. Co., Detroit, Mich.

Factories at Detroit and Muskegon, Michigan

ACME
Universal Joints

These are the best universal joints that a truck manufacturer could put in his product. They embody every essential feature necessary to make it the nearest perfect Universal Joint for use in trucks.

ACME JOINTS are remarkable for their simplicity and durability and are best adapted to withstand the severe wear and strain to which they are subjected in motor truck usage.

The ACME can be removed from a car without moving a unit of the power transmission. This feature alone gives it a great advantage over any other joint on the market.

They are so accurately made that they are interchangeable and necessary repairs can be made without difficulty.

Ask us to prove that Acme Joints are better than those you are now using—we'll do it.

The Acme Universal Joint Mfg. Co.
1421 Fulford Street, Kalamazoo, Mich.

A Strong Plug for Heavy Work

You can't expect a brittle Spark Plug to stand the strain and jars of your motor truck. Plugs insulated with porcelain, mica, etc. are bound to break.

HERZ PLUG

"Bougie Mercedes"

is an exquisite combination of STONE and STEEL. It is made to stand up, and it does. Its insulation is

Double Unbreakable Stone

It is Blue Enameled. HERZ PLUG has Four Sparking Points of Platinum-alloy, which ensure a fat, hot spark at all times. It is Self-Cleaning and

Guaranteed a Full Year

HERZ & CO., 295 Lafayette St., New York
Makers of the HERZ MAGNETO

All Bearing Bronzes Are Either Granular or Non-Granular

You can readily understand that a granular substance like chalk will wear much quicker than a fibrous or non-granular substance like a piece of wood.

You can easily see that a bearing bronze which is granular in structure will wear away much more rapidly than a bearing bronze which is fibrous.

HIGH SPEED
NON-GRAN
BEARING BRONZE

Is the Only Non-Granular Bearing Bronze

The millions of tiny particles in its makeup are fibres, which criss-cross in every direction, interlocking so as to hold together and resist frictional pull.

That is why NON-GRAN lasts twice as long as any other bearing bronze.

Tell us your bearing difficulties. Our engineers are at your service.

AMERICAN BRONZE COMPANY
1140-1180 Chester Blvd. Berwyn, Penna.

$1500 (*Chassis*) **Stewart Delivery Trucks** **$1500** (*Chassis*)

START IN NOW

Tie up with a motor delivery car that will bring satisfaction to your customers and steady profits to you

We are looking for wide-awake, reliable men, with plenty of energy and push, to handle the Stewart line of 1500 pounds capacity delivery trucks in cities and towns where we are not now represented.

For the right kind of men, with sufficient capital, we have an opportunity bigger, more profitable, more satisfying than any other business offers.

New Prices Attractive

Merchants everywhere are awake to the advantages of motor delivery. They are looking for such a car as the Stewart — one that looks right and is built right and priced right. The dealer who handles Stewart delivery cars makes easy sales and good profits.

Selling Stewarts is an all-the-year-round business. They can be sold in the winter just as readily as in the summer months.

Our cars are making good every day in more than 50 different lines of business in scores of cities throughout the United States and Canada.

Continental Motor	Bosch Magneto
30 H. P., 3¾" x 5½"	Brown-Lipe Transmission
Timken Axles	Genuine Honeycomb Radiator

Act Quickly—Today

Tie up with the Stewart now; get the agency for your locality before your competitor does. Write or wire today for catalog and liberal dealership proposition.

Stewart Motor Corporation, Buffalo, N.Y.

Separate and distinct from any other company using our name or the names of our officers

Alloy and Special Open-Hearth

STEEL

Uniform in Quality

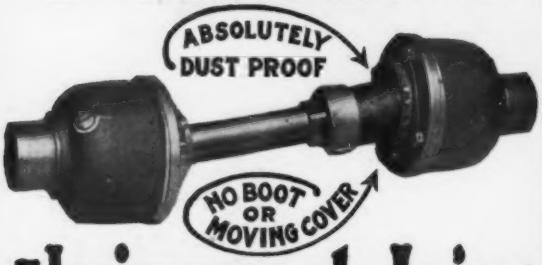
CROSS-ROLLED
(United)
PROCESS

Bars. Billets.
Slabs. Blooms.

Write us for prices

THE UNITED STEEL COMPANY
NEW YORK
CHICAGO
DETROIT
CANTON
OHIO

FEENY



Universal Joint
Has the "Strength of Gibraltar"

This **JOINT** is ideal for Commercial Car use, as its unique construction places the largest per cent of its metal where strain is greatest. Its **great strength,** combined with its **large flat bearing surfaces,** having **perfect lubrication,** unquestionably places the **"FEENY"** in a class by itself.

Let us figure with you.

FEENY-HURD CO.
MUNCIE IND.

More GOULD Battery Installations That Evidence Good Service

Contractors' trucks and wagons for delivering building material must carry heavy loads over rough roads and in bad weather, which often makes the service particularly severe.

Among firms in these lines who are profiting by the dependability and low maintenance cost of Gould-Storage-Battery-driven trucks are the following:

H. C. & A. T. Piercy Contracting Co., New York
T. I. Proud Electric Co., New York
Robertson Cataract Co., Electrical Contractors, Buffalo
J. C. Sterns Electric Co., Buffalo
Union Transfer Co., Philadelphia
I. T. Williams Co., Wholesale Lumber, New York
Meyer & Martin, Carpenters, New York
J. F. Shannon, Hardware, Philadelphia
Walbridge & Co., Hardware, Buffalo
Palmer & Lockwood, Hardware, Stamford, Conn.
Lilly & Stalnaker, Hardware, Indianapolis

Gould Storage Batteries are now driving so many vehicles of every kind, from light pleasure and delivery wagons to New York street cars, that their achievements and satisfactory service need no description.

Get one Gould Battery and you will be glad to get more.

Gould Battery renewals fit jars of any make.

Tell us your conditions and size of battery and we will gladly quote.

WRITE FOR LITERATURE TODAY

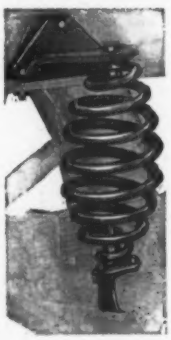
Gould Storage Battery Co.
General Offices: 30 E. 42nd St., New York
Works: Depew, N. Y.
Agents in all large cities
Full stock carried in all cities where we have offices or agents

(76)

SAGER Shock Absorbers

Absolute Necessity for Commercial Cars

SUCCEED WHERE OTHERS FAIL



Endorsed by:

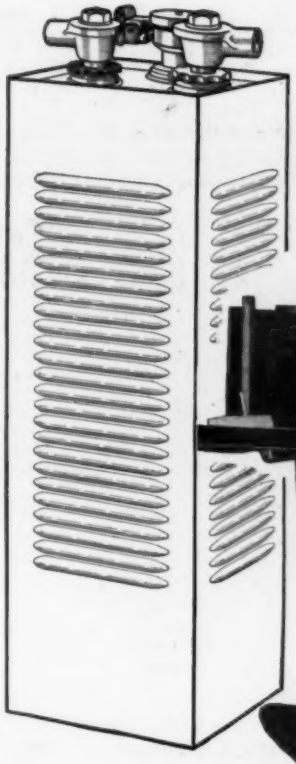
SAURER
FRANKLIN
ATTERBURY
KISSEL KAR
STEWART
OLDSMOBILE
ELMORE
CRAWFORD
LOGAN
DORRIS
RAMBLER
MAXWELL
STODDARD-DAYTON
POPE-HARTFORD
AUTOCAR
COLUMBIA

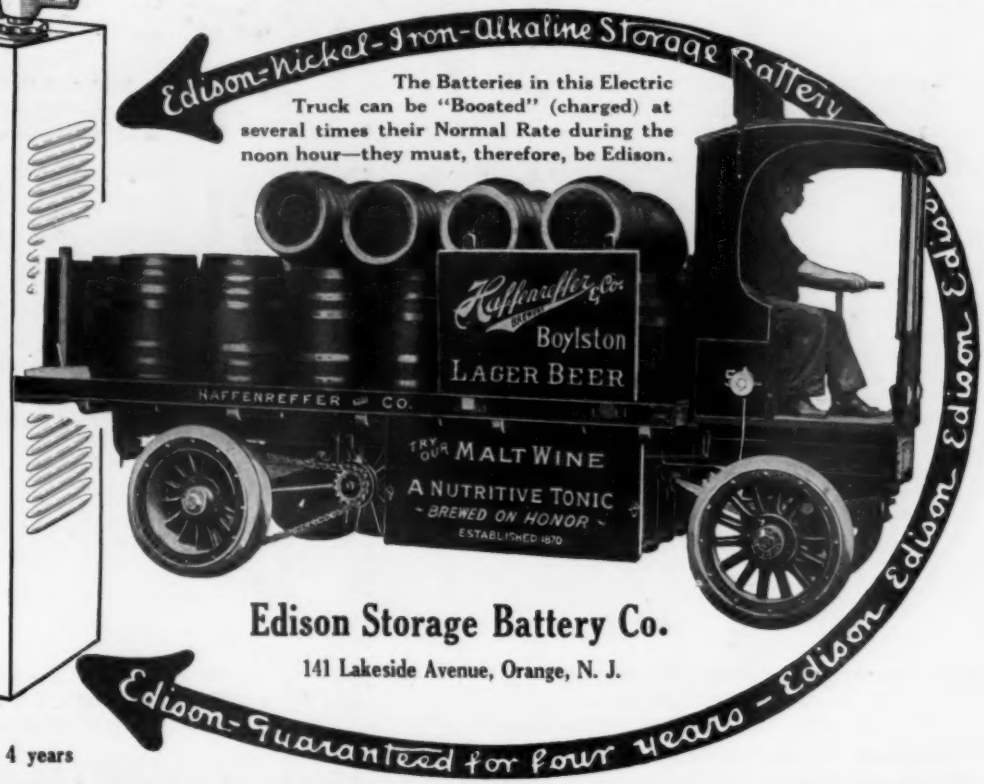
Try a set at our expense

We also make bumpers to protect radiator and other vital parts at front of truck.

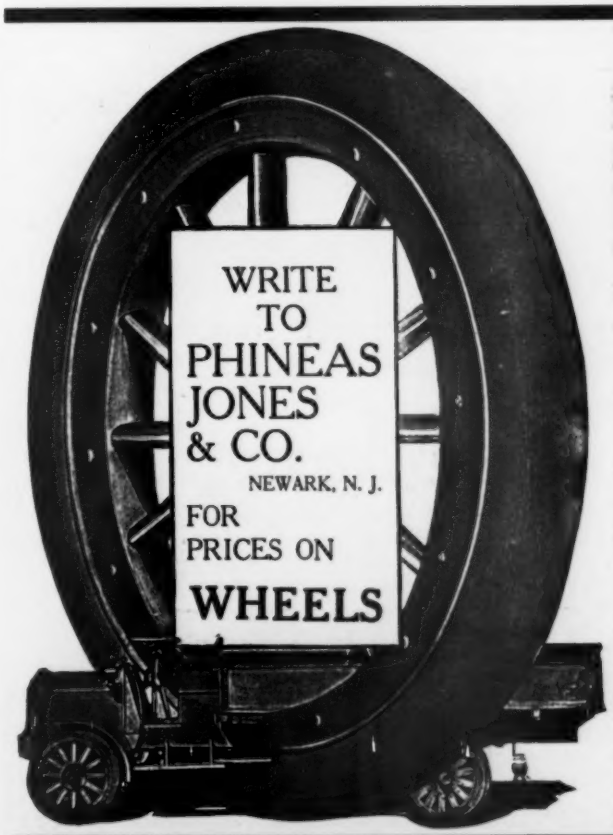
J. H. SAGER COMPANY
293 South Ave. - - Rochester, N. Y.

A BOOST AT NOON AND HOME SOON




Edison-Nickel-Iron-Alkaline Storage Battery
The Batteries in this Electric Truck can be "Boosted" (charged) at several times their Normal Rate during the noon hour—they must, therefore, be Edison.
Haffenreffer & Co.
Boylston
LAGER BEER
HAFFENREFFER & CO.
TRY OUR MALT WINE
A NUTRITIVE TONIC
BREWED ON HONOR
ESTABLISHED 1870
Edison Storage Battery Co.
141 Lakeside Avenue, Orange, N. J.
Edison-Guaranteed for four years-Edison Edison Edison Edison

Guaranteed for 4 years



AUTOMOBILE WHEELS for PLEASURE CARS and TRUCKS

Repairing and truing old wheels a specialty

Experimental wheels a specialty

We furnish and apply any style demountable or detachable rim or tire

BEST ON EARTH—KANTSAMORE
ESTABLISHED 1855

PHINEAS JONES & COMPANY

305-313 Market Street :: Newark, N. J.

Branch Factory: 12th Avenue and 55th Street, New York City

Veeder
HUB ODOMETER

Tells the whole truth and nothing but the truth about your mileage.

The only reason why a truck owner puts a recording instrument on his truck is to know the real truth about the distance it covers, so that costs can be accurately figured and the relative value of different makes and different drivers ascertained.

Any instrument which tells the truth so far as it goes but not **all** the truth is worthless for its purpose. Any which can be made to lie are still worse. Those which are part time accurate but not dependable are of no practical value.

If you want to know the truth about your mileage you want the **whole** truth—that means getting a **VEEDER,** for it is the one instrument that cannot be made to lie, that records backwards as well as forwards, that cannot be disconnected and that will tell you the whole exact truth.

The **VEEDER** is sealed to either right or left hub and cannot be taken off without the owner's knowledge. They should be on your trucks for the sake of accurate cost sheets.

Price Complete **$25.00** at dealers or direct from factory

THE VEEDER MANUFACTURING COMPANY

Hartford Conn.

Leak-Proof Piston Rings

Leak-Proof Rings are in two pieces, each having a flange which protects the opening in the other when locked together. Hence gas cannot escape through here.

This flange, likewise prevents leakage of gas, or oil working up into the combustion chamber. Thus power is saved and carbonization greatly decreased.

Mean Power Economy

Maximum power is possible only when you have a full charge and perfect compression. You cannot have either if your piston rings leak. Ordinary piston rings can't help but leak, owing to their construction. Leak-Proofs *cannot* leak for the same reason. Your truck cannot operate with maximum efficiency and economy unless so equipped. For corroboration of this statement ask any of the many thousands of Leak-Proof users,—they'll tell a story worth hearing.

"Ask the User" **"Ask the User"**

McQUAY-NORRIS MFG. CO., Dept. C

1309 Chestnut St. **St. Louis, Mo.**

BRANCH OFFICES:

NEW YORK, N. Y. Room 83, Lincoln Sq. Court 64th and Broadway

CHICAGO, ILL. Suite J9, Merchants Bldg. 106 N. La Salle St.

PITTSBURGH, PA. 7620 Tioga St.

KANSAS CITY, MO. 1504 Grand Ave.

LOS ANGELES, CAL. 224 Central Bldg. 6th and Main Sts.

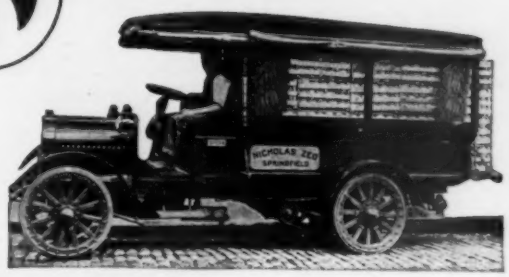
FORT WORTH, TEXAS 108 Bryan Ave.

SAN FRANCISCO, CAL., 164 Hansford Bldg.

The Best One-Ton Truck on the Market

for $500 Down

A business proposition that appeals to any man who desires an up-to-date delivery service.



THE SELDEN TRUCK

embodies only the best ideas and most practical features of truck construction. Sturdy and reliable. Easy to handle. Economical to operate. It furnishes a delivery service you can depend upon in all kinds of weather over all sorts of roads.

THE SELDEN SALES PLAN

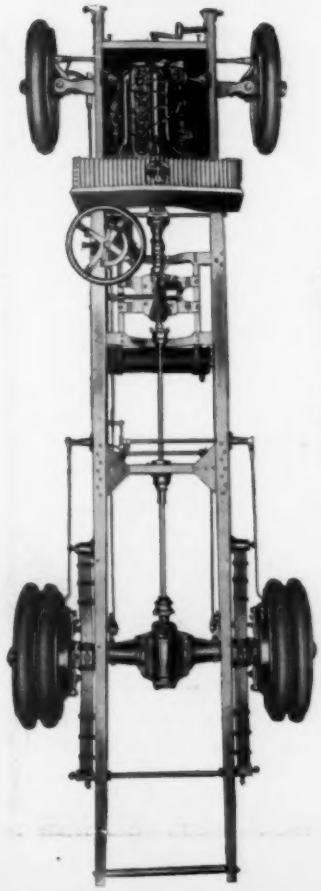
enables any business house to put the Selden $2000 Truck in service upon the payment of $500. Then the Truck earns the monthly payments.

Many users are buying additional Selden Trucks to take care of the business created by the increased scope of their delivery service.

Agents with the right kind of sales and service facilities wanted

Selden Truck Sales Company

215 East Avenue *Pioneers in Selling Trucks on Time* **Rochester, N. Y.**



WORM DRIVE

And a silent, powerful, smooth-running, mechanism in the

NEW 1½ TON LIPPARD-STEWART

Chassis Price, $2300, F.O.B. Factory

With Lippard-Stewart worm drive, the quality of truck service is always maintained at the highest. Engineering tests have proved that this axle utilizes more actual pulling effort than any other drive system. Wear is practically negligible when compared with that occurring when jack shaft and chains or bevel gears are used. After years of service, the worm drive does its work with the same efficiency as when it was new. Power is applied smoothly—without jolt or jar—without a sound.

Lippard-Stewart Model F's rear axle is of Timken make and is equipped with the famous David Brown worm and gear. It is the product of English and American designers who are specialists. Its adaptability to truck work makes other rear systems back numbers. It sets a standard for trucks of its capacity. The dealer who sells, or the firm which uses, the Lippard-Stewart Model F has a trade advantage by virtue of the truck's up-to-dateness.

THESE FEATURES BACK UP THE ADVANTAGES OF WORM DRIVE

Lippard-Stewart Model F is an example of balanced construction. The truck's high quality is maintained from end to end. 35 H.P. developed by the Continental motor; automatic governor for speed control; cone-clutch and Brown-Lipe transmission with capacity greater than motor rating; straight line shaft drive; frame with the reserve strength to withstand the hardest strains; perfect cooling by a built-up tubular radiator; wheel base 145″ or 158″; solid tires, 36″ x 3½″ front, 36″ x 3″ dual, rear; ease and safety of control; accessibility and simplicity—these features round out a truck that, for its capacity, is the leader in the commercial car market.

DEALERS!

Model F conforms to what your trade wants. And you know how the Lippard-Stewart 1500-pound delivery car has built up a reputation for satisfactory service. These two models, logical in design and price, will bring to your sales room the majority of prospective commercial car business. Our proposition holds out money-making possibilities for you. Write for it now and ask for descriptive literature. Your territory may yet be unassigned.

LIPPARD-STEWART MOTOR CAR COMPANY, 1738 Elmwood Ave., Buffalo, N. Y.

AUGUST BECKER, President and Treasurer **E. J. BARCALO, Vice President**
J. C. MILLAR, Secretary **C. S. DAHLQUIST, Chief Engineer**

When Writing, Please Say—"Saw Your Ad. in the C C J"

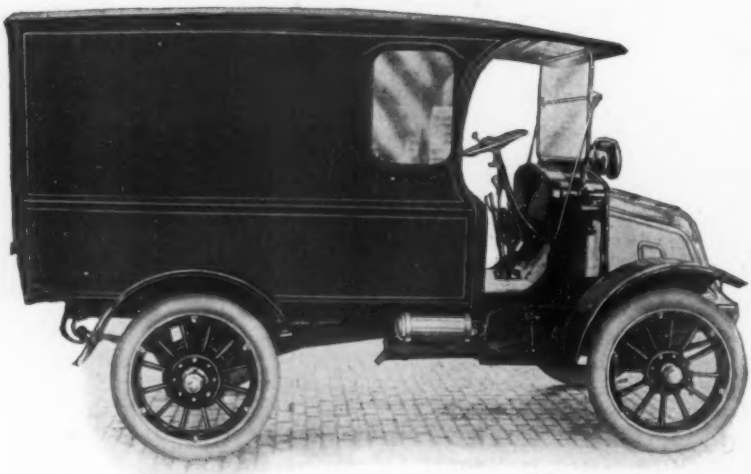
CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.

CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

The Krebs Governor Assures Expert and Economical Operation



Model BB Krebs, with closed commercial body.
Loading platform, 46 inches wide, 82 inches back of seat. Height of body, 55 inches.
Price of chassis, $1,425. Truck, with body as shown, $1,650.

THE KREBS is called "The Car That Thinks" because it automatically makes its driver an expert.

He has no chance to mishandle "The Krebs"—the governor is too quick for him.

It is the only **variable** governor and it is in control at all times, handling the motor within a specified speed range with greater economy and precision of operation than can be accomplished by human brains and muscles.

Up grade or down—on good or bad roads—the Krebs governor is on watch for the car's owner, giving maximum efficiency with the minimum of fuel.

Write today for complete information about the Krebs and its wonderful controlling mechanism.

THE KREBS COMMERCIAL CAR CO., CLYDE, OHIO

Worm and Wheel Story

England, the home of worm drive, gives the best evidence of its value for trucks. At the last Commercial Car Show, held in July, in London, the following list tells its own story:

(EMBRACING ALL THE BIG MAKERS)

Worm-driven models	**21**
Chain-driven models	**12**
Bevel-driven models	**6**

Being familiar with its great power and efficiency, the English makers have adopted it.

The man who has made the worm drive a success in England is now with us.

Give us the horse power of your car, approximate speed of the driving shaft, ratio required and the approximate weight of the machine, and let us send you a blue print of what we would recommend.

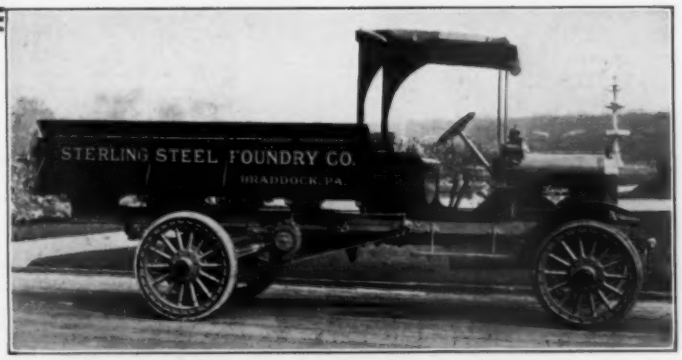
Why experiment with experimenters?

The Cleveland Worm and Gear Co.

988-992 East 67th Street **CLEVELAND, OHIO**

The Less a Driver Has To Do, the More Likely He Is To Do It.

Reduce the number of wearing points on a truck, and provide easy lubricating facilities, and you have a vehicle that will cost less per mile of haul than one that requires more of the driver's attention. This is one of the many good features of



LANGE TRUCKS

Built and tested in a city acknowledged to be "the motor-truck test-ground of the world", they have earned the title of

"THE TRUCKS THAT LEVELED PITTSBURGH"

Their uniform reliability under service conditions that have sorely tried all other makes, should commend them to your thoughtful attention.

Why not send your engineer—or come yourself—to our factory—"the only automobile factory in Pittsburgh"—and let us give you a working demonstration?

LANGE MOTOR TRUCK COMPANY **PITTSBURGH, PA.**

When Writing, Please Say—"Saw your Ad. in the C C J"

TRUCK PARTS

Sprockets—Blank or Formed.

Sprockets and Brake Drums—Combined for chain or internal drive.

Front Axles.

Radius Rods.

Every casting carefully annealed.

MICHIGAN STEEL CASTING CO.
DETROIT, MICH.

Noiseless

"S. R. B." Annular Ball Bearings

Silent Type Annular Ball Bearing with Maximum Number of Balls

We are offering an absolutely noiseless Annular Ball Bearing for Electrical Vehicle service. In eliminating the noise, we have in no way decreased the efficiency of the Bearing but have greatly increased its life.

Let us submit samples, they prove our claims.

STANDARD ROLLER BEARING CO.
50th Street and Lancaster Avenue, Philadelphia, Penna.

HESS-BRIGHT

Quality

It is both our aim and achievement to make HESS-BRIGHT BALL BEARINGS of such high quality that they shall be equal to every demand and be supreme in their field.

Main Office and Plant No. 2, on New York Division of Pennsylvania R. R., Front St. and Erie Ave., Philadelphia, Pa.

Service

Complying with the urgent request of many of our customers, we have made additional provision for repairing our own bearings.

We do this work with the same extreme care and precision that obtain in their manufacture — WE VIRTUALLY REMAKE THEM.

Stores for Retail Distribution:
Philadelphia, 666 N. Broad St.
New York, 1974 Broadway
Chicago, 1800 Michigan Ave.

THE HESS-BRIGHT MANUFACTURING COMPANY

BALL BEARINGS

An Example—

OF HOW GOOD A TRUCK CAN BE;
OF HOW WELL IT CAN BE BUILT;
OF WHAT CAREFUL DESIGNING, SUPERIOR MATERIALS, PERFECT WORKMANSHIP AND A DETERMINED ADHERENCE TO TRUCK CONSTRUCTION WILL PRODUCE.

Our trucks merit an investigation. Write for Catalog

WILLET ENGINE & TRUCK CO., Inc. 6-8 Lock St. Buffalo, N. Y.

When Writing, Please Say—"Saw Your Ad. in the C C J"

YOU CAN DO IT WITH A REO

Reo Model J Truck
2 Tons Capacity
$1650, Body Extra

$150 REDUCTION

In the Price of This Truck Will Enable Reo Dealers to Double Their Sales

This is the most important announcement that has been made this year to motor truck dealers and salesmen. We have taken $150 dollars off the price of Reo Model J Truck. Instead of $1800, chassis price for the past year, it will be sold in the future, beginning October 1, 1913, for $1650.

Dealers did not ask for this reduction. The public did not demand it. At $1800, it was far lower in price than any other two-ton truck of recognized standing in the field. Its business efficiency, insured by the latest accepted engineering ideas, has been beyond question.

We have made this unlooked-for reduction for two reasons:

First: It is a primary principle of Reo policy to give the user the benefit of every saving effected by our large quantity production. As the demand for the Reo Model J Truck increased, we have been able to reduce costs to a point impossible with a smaller organization, no matter how efficient. This reduction has been possible without in the least sacrificing quality of product, or our own modest percentage of profit. We feel that the buying public, whose support has made this reduction possible, are the logical ones to profit by it.

Second: From the reports and comments so far received from our dealers, we confidently believe that this reduction will enable them to sell twice as many trucks as before. Bringing the cost down makes it possible to figure an even larger saving to the purchaser of motor trucks, when figured against his old delivery methods.

You may have noticed that thus far we have said nothing about the effect of this reduction in enabling our dealers to outdistance competition.

While the difference in price is very striking (54 competing two-ton trucks average in price $2701) yet Reo dealers rely on the obvious superiority of Reo construction and design, rather than price, when comparison is made with competing trucks. What competition, we ask, can show features like these?

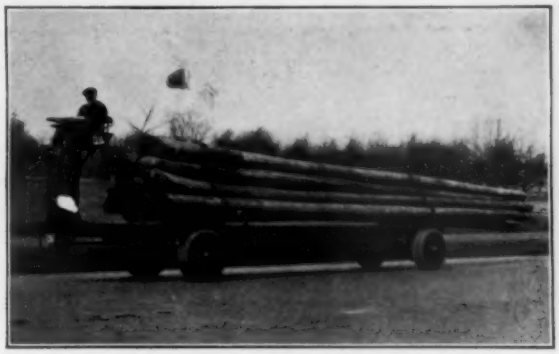
Reo Sectional Radiator, of 24 separate, interchangeable units,—it can be repaired, when necessary, on the road anywhere; clutch and transmission are cushioned on sub-frame, away from jars and road shock; left-side drive, and the best and handiest center control ever brought out; big armored frame; demountable driver's cab; gas headlights and Prest-O-Lite tank; Reo Hydraulic Governor, controlling rate of speed;—these are a few of the features that turn inquiries and demonstrations into actual sales.

We Want More Dealers

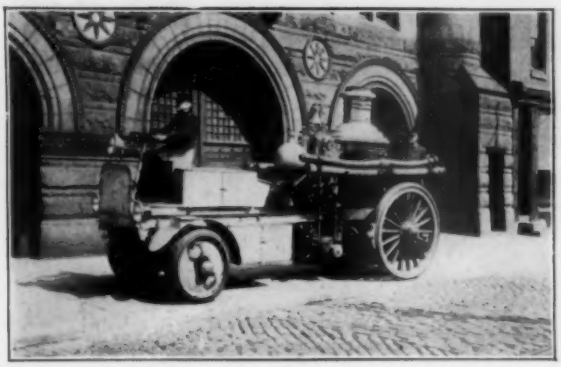
If you can sell trucks at all, you can sell Reo Trucks easier, quicker and oftener than any other kind. If you have never sold trucks, but are able and equipped to go into this profitable line, you have but to look about you to see that 1914 will show an immense increase in the number of motor trucks bought and used.

This is your opportunity for big profits to reward honest effort. Will you write us today for some real facts about the big possibilities of this field? We want to tell you what Reo Truck dealers in every part of this country are doing.

REO MOTOR TRUCK COMPANY, 1915 South Washington Ave., Lansing, Mich.



6 ton Electric Pole Truck owned by the Philadelphia Electric Co., equipped with 42 cells, type MV-21, "Exide" Battery.



Electric Tractor applied to fire engine, owned by the City of Philadelphia, equipped with 88 cells, type MV-11, "Ironclad-Exide" Battery.

Built for the Efficient and Economical Operation of Electric Vehicles

The 4 "Exide" Batteries

"Exide", "Hycap-Exide", "Thin-Exide", "Ironclad-Exide"

Used by the largest electric vehicle users Let us tell you who they are

Electric Delivery Wagon owned by The Georgia Railway & Power Co., Atlanta, Ga., equipped with 44 cells, type MV-7, "Ironclad-Exide" Battery. This car ran 24,000 miles in 19 months and was only out of service two working days.

5 ton Ice Truck and trailer. The truck is equipped with 44 cells, type MV-31, "Thin-Exide" Battery. This truck hauls from 50 to 60 tons per day over the hills of Cincinnati.

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of The "Chloride Accumulator," The "Tudor Accumulator," The "Exide," "Hycap-Exide," "Thin-Exide," and "Ironclad-Exide" Batteries.

New York Boston Chicago **PHILADELPHIA, PA.** Denver San Francisco Seattle
St. Louis Cleveland Atlanta Detroit **1888-1913** Los Angeles Portland, Ore. Toronto

886 "Exide" Distributors 9 "Exide" Depots "Exide" Inspection Corps

Who Made Your Motor Truck?

Was it assembled by some local machine shop or built by a growing concern making *nothing but* commercial vehicles?

Buy a motor truck by all means, because practically any kind will show you the relative inefficiency of horses; but when you really motorize, *standardize* on some good make of truck.

Today business stability implies ample capital—plus. In the motor truck world it means a product of sound design and proven efficiency, backed by a well-balanced manufacturing and distributing organization. No motor truck makes a successful side line. This new industry seems to require specialized concentration—*almost consecration*—of the highest type.

G. V. ("General Vehicle") ELECTRIC TRUCKS

The firms who are today standardizing on the G. V. product have in most cases been "through the mill" in buying trucks. Many tried out the 1901-1905 Electrics, in disgust bought gasoline machines, and are now going back to the improved Electric. The 3000 odd G. V. Electrics in service—many 6 to 11 years old—have greatly influenced their decision, as scores of motor truck makers have come and gone since 1901.

The G. V. product is dependable. From an engineering standpoint it ranks AA1, and users in 108 lines of trade know what it will do over a long period of years. Its makers have weathered the lean trying years and are now continuously expanding *out of actual earnings*. You will never be ashamed to say "Mine are G. V's."

Catalogue 84 on request.

General Vehicle Company, Inc.

General Office and Factory: Long Island City, N. Y.

NEW YORK CHICAGO BOSTON PHILADELPHIA

GASOLINE TRUCKS — GMC — ELECTRIC TRUCKS

GENERAL MOTORS COMPANY

Both for commercial and economic reasons, the electric truck is the logical power wagon for Central Stations to use and advocate.

The gasoline truck, however, has a wide field of utility outside the range of the electric machine.

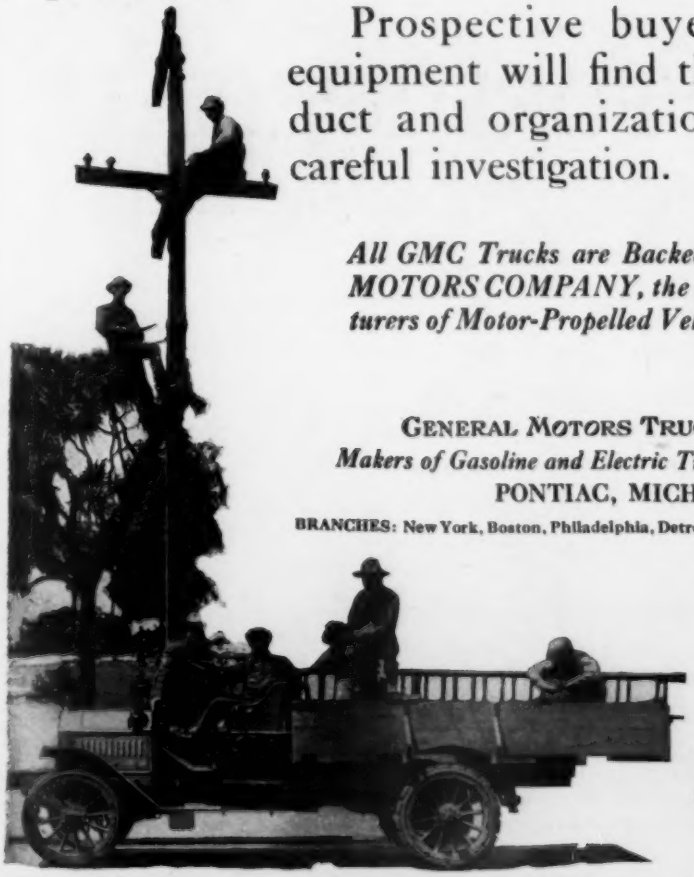
Both types are necessary to solve efficiently the problems of modern road transportation.

General Motors Truck Company builds both gasoline and electric trucks in capacities and sizes to meet every business requirement.

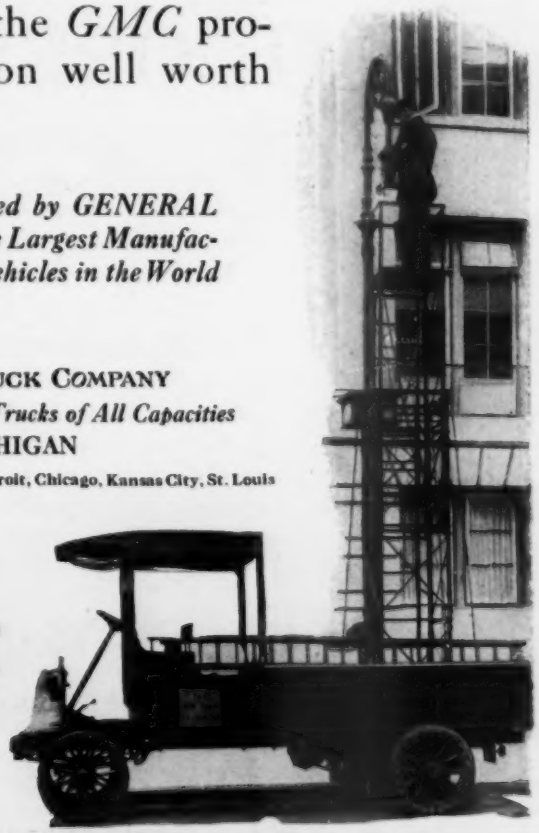
Prospective buyers of motor equipment will find the *GMC* product and organization well worth careful investigation.

All GMC Trucks are Backed by GENERAL MOTORS COMPANY, the Largest Manufacturers of Motor-Propelled Vehicles in the World

GENERAL MOTORS TRUCK COMPANY
Makers of Gasoline and Electric Trucks of All Capacities
PONTIAC, MICHIGAN
BRANCHES: New York, Boston, Philadelphia, Detroit, Chicago, Kansas City, St. Louis

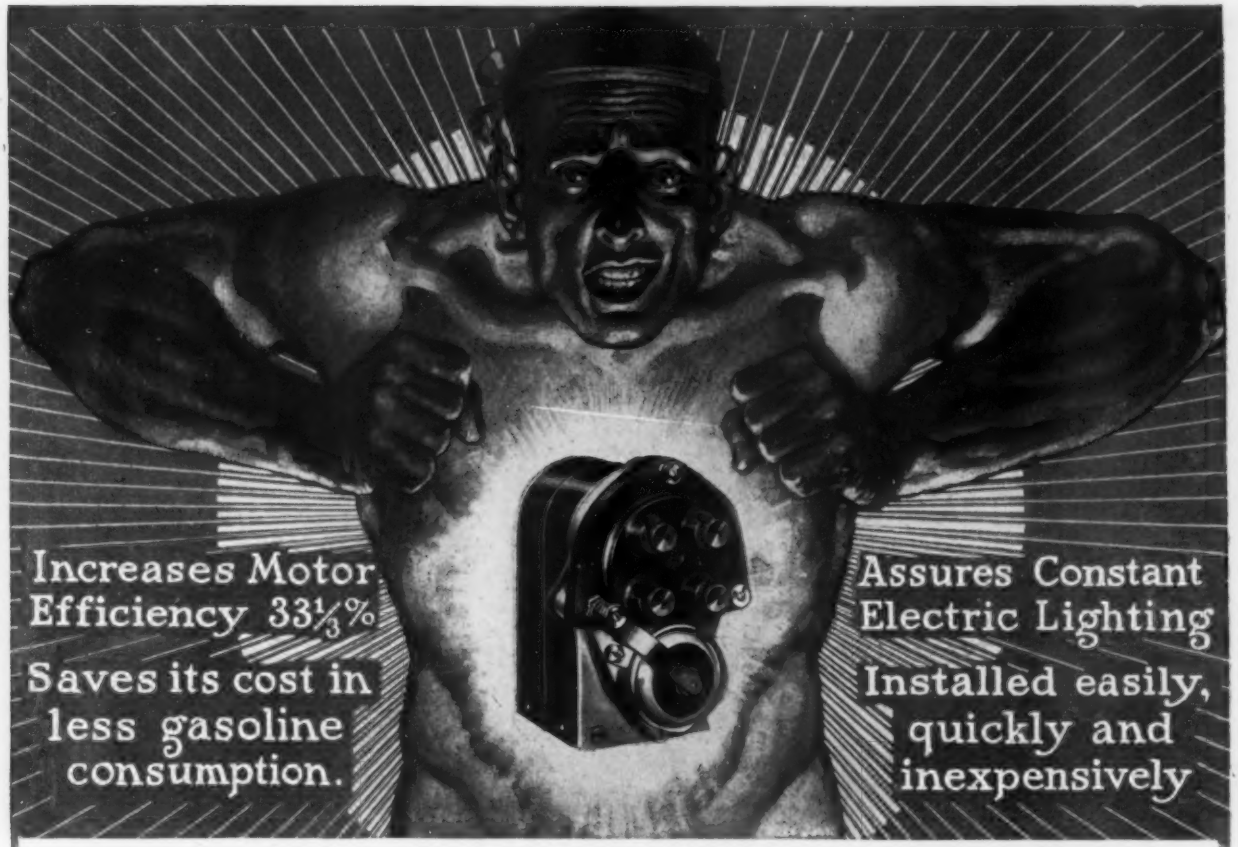


The Pacific Gas & Electric Co. uses two one-ton *GMC* Gasoline Trucks and one *GMC* Electric



The New York Edison Co. now has ten *GMC* Electrics in successful service

When Writing, Please Say—"Saw Your Ad. in the C C J"


Increases Motor Efficiency 33⅓%
Saves its cost in less gasoline consumption.
Assures Constant Electric Lighting
Installed easily, quickly and inexpensively

SPLITDORF "FORD SPECIAL"

WATERPROOF HIGH-TENSION MAGNETO

The SPLITDORF ELECTRICAL CO. has harkened to the insistent demand of Ford owners and agents and has produced a thoroughly-tested high-tension magneto that promises to revolutionize the running of these remarkable cars—commercial as well as pleasure cars.

Waterproof, and enclosed-gear driven, the Splitdorf "Ford Special" High-Tension Magneto is of special construction to meet the demands of Ford cars. With its installation the nuisance and expense of vibrators, coils and batteries pass away and a high-tension system secured that is second to none.

Write or Call Today upon our nearest Branch House for full information

SPLITDORF ELECTRICAL COMPANY

ATLANTA, 10-12 E. Harris St.
BOSTON, 180-182 Mass. Avenue
CHICAGO, 64-72 E. 14th Street
DETROIT, 972 Woodward Ave.
KANSAS CITY, 1823 Grand Ave.
LOS ANGELES, 1226 S. Olive St.
NEWARK, 290 Halsey Street
NEW YORK, 18-20 West 63d St.
PHILADELPHIA, 210-12 N. 13th St.
SAN FRANCISCO, 1028 Geary St.
SEATTLE, WASH., 1628 Broadway
LONDON BUENOS AIRES

Electric Trucks Give Long Service

RELIABILITY is the keynote of Electric Vehicle design and construction. Note these facts:

There are several Electric Trucks of 1899 model still running.

F. A. Poth & Sons Brewery, in Philadelphia, is using daily an Electric Truck delivered eleven years ago.

Several of the Electric Trucks operated by the New York Edison Company have been in use ten years. An Electric has been used by Frederick Loeser & Company, Brooklyn, for eleven years; another by Stern Brothers, of New York City, for nine years. Three of the Electric Vehicle fleet of Tiffany and Company were delivered to their firm early in 1901. Three of the Electric Trucks owned by Arnold Constable & Company, New York City, were purchased in 1903, and an Electric built for B. Altman & Company in 1898 is regularly used.

The price of electric current for battery charging is constantly decreasing. During the last ten years the average price throughout the United States has decreased over 328 per cent.

The average cost of all Electric Commercial Vehicles preceding 1911 was $3369.72. In 1911 the average was $2465.18—*and the trend is steadily downward.*

You really should investigate Electric Trucks now.

Send for this Book Today "The Story of the Electric Truck"

The facts and figures that you want to know about the Electric Truck are contained in this beautifully printed book of 32 pages—yours on request. Cost of operation—actual photographs of newest model Electric Trucks. Send for it today. Kindly address Dept. D.

76a

Electric Vehicle Association of America

BOSTON 124 W. 42nd St. NEW YORK CHICAGO

When Writing, Please Say—"Saw your Ad. in the C C J"

New Departure Ball Bearings

American-made for American trade

New Departure ball bearings are extensively used in electric trucks for the reason that they give maximum mileage per charge—minimum operating cost per mile.

They are the most efficient bearings for use in vehicles depending upon stored energy, because they transmit power without waste.

New Departure ball bearings consume about one-fiftieth of the power absorbed by average plain bearings, and one-tenth of that required by roller bearings.

Another point to consider:

The capacity of the storage battery is limited and can be injured by abuse. A high discharge rate will hasten battery depreciation.

With ball bearings in the car, the battery is more efficient, because it is depleted slowly.

These are a few of the reasons why New Departure ball bearings are particularly adapted to the work of electric trucks.

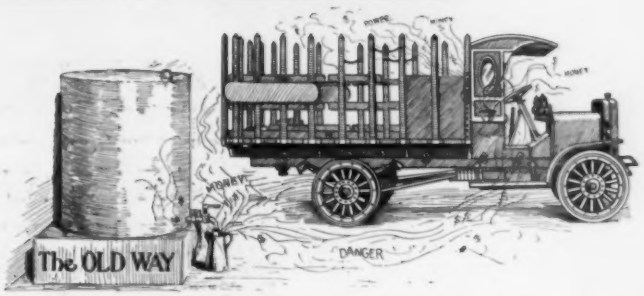
New Departure ball bearings are guaranteed. Shall we send you a catalog?

The New Departure Mfg. Co.

Western Branch, 1016-17 Ford Bldg., Detroit **Bristol, Conn.**

Wherever You Smell Gasolene You Need a Bowser

Stop the Leaks!

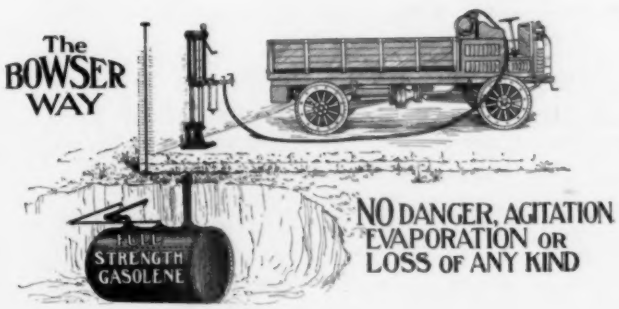


Why continue to pay for gasolene you never get to use? Turn ***all*** your gasolene into mileage.

Just so long as you continue to store gasolene in tin receptacles, keep it in any old place above ground, you will lose at least 20% of the power-producing vapor, which will never reach your engine. How many miles would this loss drive your truck?

High-priced efficiency experts are combing over the intricacies of many a business to find and stop leaks of 1% or less, and yet, many car owners are suffering a great loss in gasolene, without protest.

Stop the leaks in your garage! And don't blame the chauffeur. He's just as anxious to make a showing as you are to reduce up-keep. **A BOWSER SYSTEM** will do both. It will save you money every day, by preventing evaporation and loss of every kind. It's safe, too, removing all danger of fire and explosion. It will assist your employees to take more pride in their work.



Safety, economy and convenience dictate the installation of a **BOWSER SYSTEM.** There's one suitable for every condition—**price, size** and **style** to exactly meet your needs. Send for our free book—it tells all about them, and will not obligate you in the least.

LOOK FOR THE ON THE ROAD RED SENTRY

S. F. BOWSER & CO., Inc.

HOME PLANT AND GENERAL OFFICES

Box 2118 FORT WAYNE, IND., U. S. A.

Sales Offices in all Centers and Representatives Everywhere

Original patentees and manufacturers of standard self-measuring hand and power-driven pumps, large and small tanks, gasolene and oil-storage and distributing systems, self-registering pipe-line measures, oil-filtering and circulating systems, dry-cleaners' systems, etc.

ESTABLISHED 1885

WHEN AT HOME USE A BOWSER

POLACK TYRES

INSURE TRUCK SERVICE

Ask Polack Users

GRAND PRIX, PARIS 1900

NEW YORK OFFICE AND SALESROOM 199 FULTON STREET

GENERAL OFFICES AND SALESROOM 105 HUDSON ST., JERSEY CITY, N.J.

CENTRAL TELEPHONE STATION "6040 CORTLANDT" NEW YORK

Address Reply MANUFACTURING DEPT. Jersey City, N. J.

Colgate & Company
(Established 1806)
Soap Makers & Perfumers
New York.

FOREIGN DEPOTS LONDON, PARIS, BERLIN, VIENNA, SYDNEY, MONTREAL, CAPETOWN, YOKOHAMA, HONGKONG, CALCUTTA, BUENOS AIRES, RIO DE JANEIRO

CABLE ADDRESS "CASHMERE" NEW YORK ALL CODES

Sept 12, 1913.

The Polack Tire & Rubber Co.,
246 West 59th Street,
New York City.

Gentlemen:--

Your letter of September 6th was duly received. On March 11, 1913, on our 6½ ton Saurer truck we replaced the Polack front tire which had been put on when the car was delivered to us on August 7, 1911. In this time they had run 14,473 miles.

Hoping this is the information you desire, we remain

Yours very truly,

COLGATE & CO.

D W Taylor Supt

Dict.DWT:KGW

Satisfactory truck service depends on satisfactory tyre service. Far-sighted Truck Manufacturers therefore fit POLACK Tyres as an absolute insurance of service to their Customers.

Our guarantee of 10,000 miles is invariably exceeded. Each mile more resilient at less cost per mile.

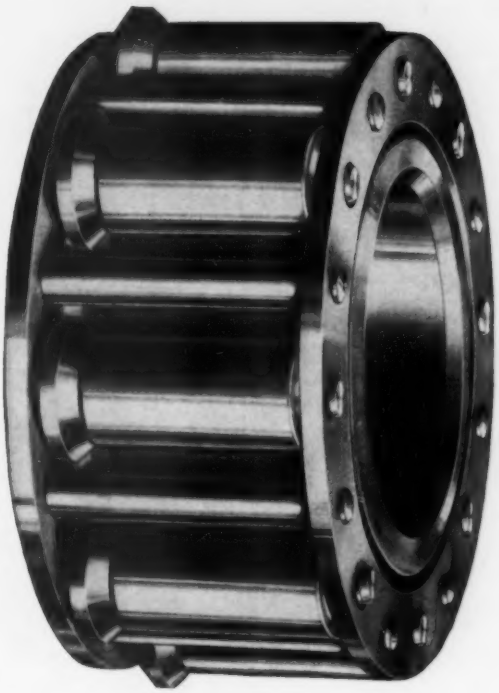
POLACK TYRE & RUBBER CO.

NEW YORK

Factory, Bridgeport, Conn.
Boston, 146 Summer Street
Philadelphia, 1803 Market Street
Chicago, 1344 Michigan Avenue
Detroit, Goldberg Building
St. Louis, 1830 Locust Street
Pittsburgh, First Ave. & West St.
Washington and Baltimore

When Writing, Please Say—"Saw Your Ad. in the C C J"

"BOWER SAVES POWER"



How Bower Saves Power!

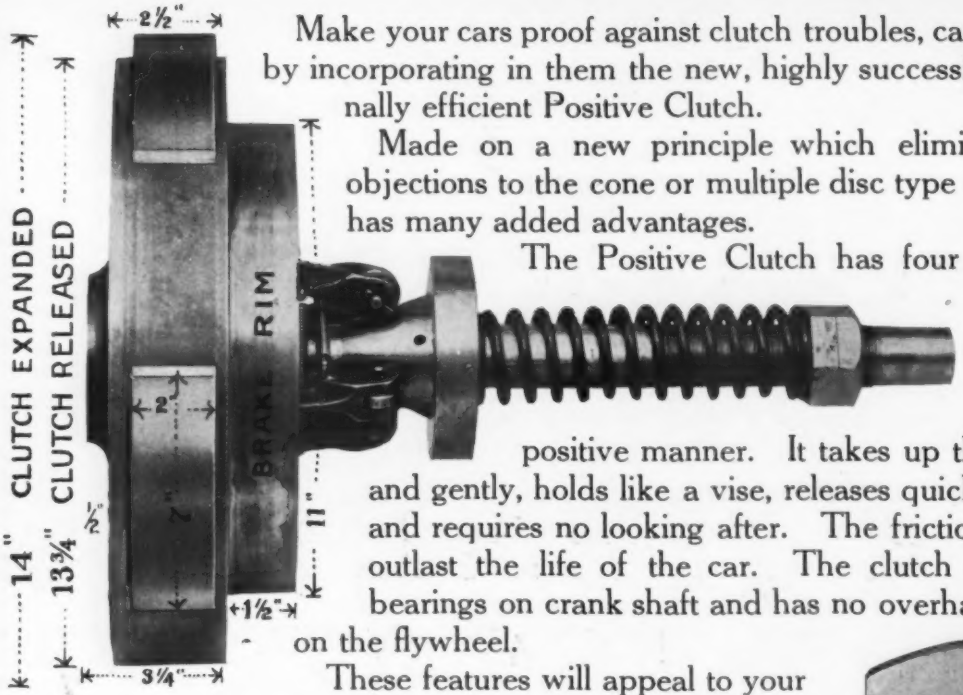
The Bower Bearing has a cylindrical roller with a flanged head at one end. The flange takes care of end thrust, the roller of radial load. This simple division of labor gives two extraordinary advantages to Bower Bearings: (1) it reduces friction to a minimum and (2) it obviates the need of any adjustment. Moreover, the raceways and the rollers being at all times parallel, the rollers are self-aligning. Thus a maximum diameter of rollers can be used; their speed of rotation is comparatively low; wear is minimized, and long life is assured to the bearing.

BOWER ROLLER BEARING CO.

DETROIT, MICHIGAN

When Writing, Please Say—"Saw your Ad. in the C C J"

TRUCK ENGINEERS DESIGNERS MANUFACTURERS Attention!



Make your cars proof against clutch troubles, care and repairs by incorporating in them the new, highly successful, phenomenally efficient Positive Clutch.

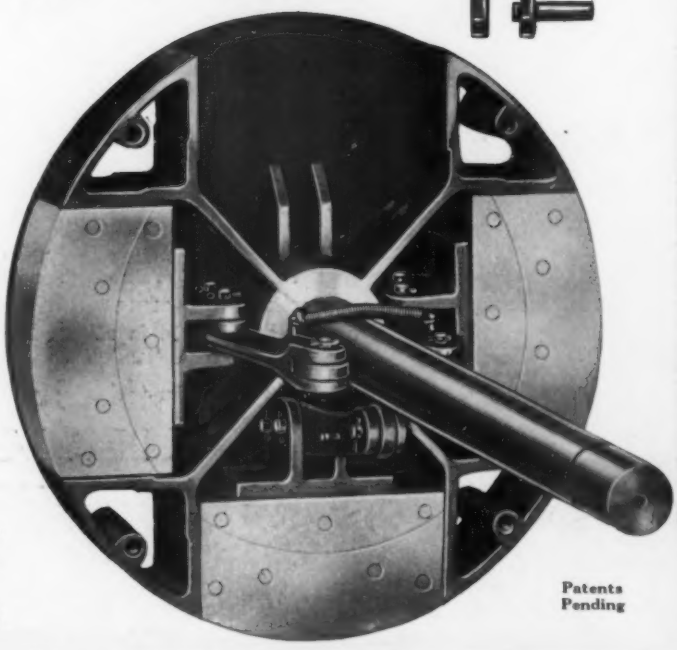
Made on a new principle which eliminates all the objections to the cone or multiple disc type of clutch and has many added advantages.

The Positive Clutch has four shoes which expand in a rim of flywheel and engage in a positive manner. It takes up the load softly and gently, holds like a vise, releases quickly and freely and requires no looking after. The friction blocks will outlast the life of the car. The clutch runs on ball bearings on crank shaft and has no overhanging weight on the flywheel.

These features will appeal to your customers.

The Positive Clutch is guaranteed to be free from the usual clutch troubles. It is not affected by oil, water or heat. It requires no care. Its durability is virtually unlimited. Its action is quick and positive. It enables you to nurse car along without changing of speeds. It saves transmission gears from being chewed and battered up in changing speeds.

This clutch, with its freedom from troubles, will help sell your car. Write for prices and detailed information.



Patents Pending

Positive Clutch Company

(NOT INC.)

1345 RAWSON ST., CHICAGO, ILLINOIS

Three Years Ahead

There's a great story wrapped up in those three words. It's a story of pioneering, of blazing the way for others to follow, of struggles, trials and tribulations, of proving a theory which others ridiculed. It's a story of perseverence and achievement which found expression in that wonderful success,

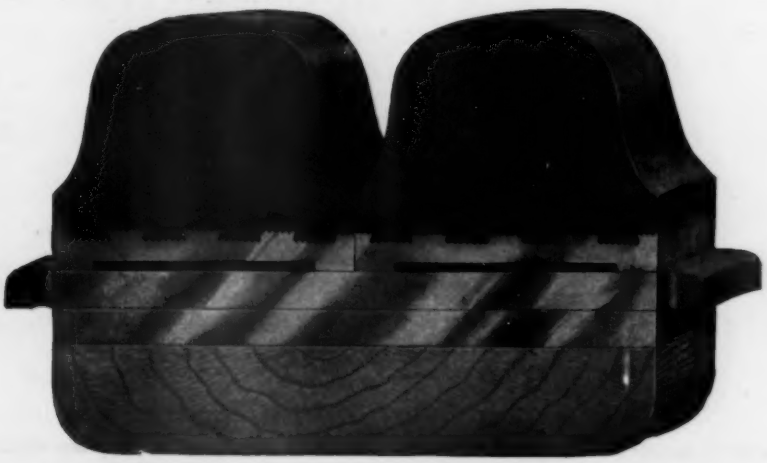
GIBNEY WIRELESS TIRES

When time, tests and service proved their superiority to all other tires for truck service, other makers began to experiment along the same lines — but we were three years ahead. While *they* were striving to produce their *first* product, *we* were producing a proved *success* and bending our energies toward so improving it that it would still keep three years in advance. The tires in service show how well we have succeeded.

If you want to sell a tire that is setting the pace in commercial tiredom, write for our exclusive agency proposition.

Gibney Tire & Rubber Co., Factory, Conshohocken, Pa.

Philadelphia New York Boston Minneapolis Baltimore



There is nothing in Goodrich Advertising
That isn't in Goodrich Goods

A Side by Side Test

SOME five or six weeks ago a 3-ton Packard truck belonging to Werner Brothers of Chicago, rolled into our service station in that city, and was equipped with Goodrich Wireless Demountable Dual Tires on one rear wheel. The same day they had the other rear wheel "shod" with tires of another make, but of the same size and style.

The driver of this truck drove around to our Chicago store a few days ago to show us that his

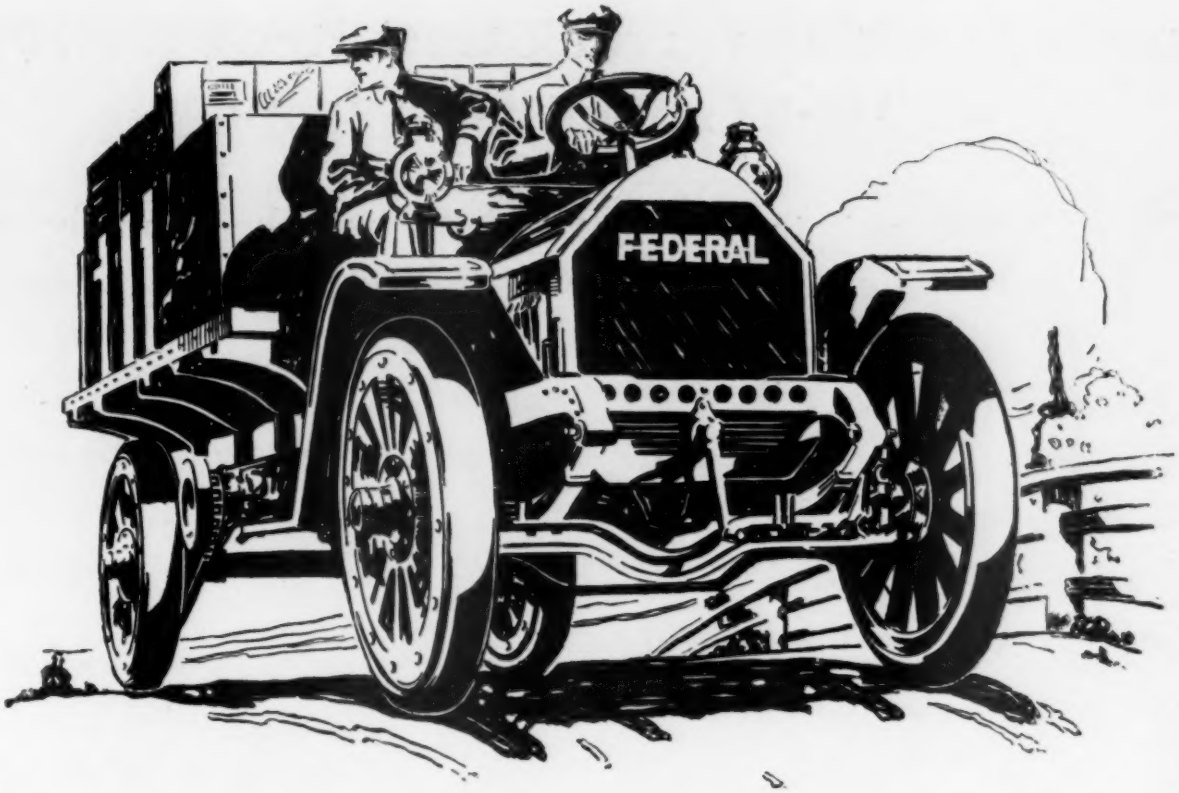
GOODRICH
WIRELESS
TRUCK TIRES

were as good as new, while that very day he had been laid up while the tires on the other side, after only 1400 miles of service, were being replaced by new ones.

This is but an every-day occurrence, and owners are coming to see the advantage in ***continuous service*** over ***frequent replacements***—no matter how favorable the adjustments with their expensive lay-ups.

Ask for our hand-book, "Motor Trucks of America."
You'll find it interesting.

The B. F. Goodrich Company
Makers of Goodrich Tires and Everything that's best in rubber
Factories AKRON, O.
Branches in all Principal Cities



Because we build more trucks of one type than anyone else—your transportation costs less

We have always built trucks of *one size and capacity*, and are today the *largest producers of 3,000 pound trucks.*

That's why we can produce this truck at a price of *$300 to $1000 less than any other truck approximating the high efficiency and low up-keep* of the Federal.

Federals are working in *over 100 lines of business*, and in *every state in the Union.*

Let us send *your* copy of the Blue Book of Traffic. It is the story of *the modern method of delivery* — FEDERALIZED TRANSPORTATION.

PRICE Includes Seat, Lamps, Tools, etc.	**$1800** F.O.B. Detroit	Body Extra. Built to meet individual requirements

FEDERAL MOTOR TRUCK COMPANY, DEPT. A, DETROIT, MICH., U. S. A.

When Writing, Please Say—"Saw Your Ad. in the C C J"

The Motor Truck Cost Recorder That Cannot Go Wrong

YOU'VE got to know the daily, weekly, monthly and yearly mileage of your motor trucks — gasoline or electric — in order to detect faulty operation. You've got to know the *correct* mileage or your operating-cost figures will be all wrong. The one instrument that can accurately do this important book-keeping for you is the Stewart Hub Odometer. It can be easily and quickly attached to any truck and costs but $15.

The Stewart Hub Odometer

$15
Complete

registers every turn of the motor truck's wheel. Error is an absolute impossibility.

Instead of thin metal discs, its drive consists of steel pinions with worm and spiral gears. Every pinion is carefully and precisely machined from a single piece of steel, heat-treated and hardened. This drive *must* transmit each move of the wheel. It *cannot* fail to act and act *correctly*.

The dials of the Stewart Hub Odometer are solid brass, mounted on special steel shafts. They are rigidly locked by our Geneva Stop principle except at the instant of registering. Then only the dial intended to shift is unlocked, automatically turned and securely locked again.

Here also there is no possibility of failure. The wrong dial *cannot* turn. The right dial *must* turn. The dial numbers are large and clear — unmistakable.

If you are now operating motor trucks, be sure to have a Stewart Hub Odometer attached to each without delay. If you are about to purchase trucks, don't forget to specify Stewart Hub Odometers in your truck order.

The Stewart Speedometer Factory

STEWART-WARNER SPEEDOMETER CORPORATION

1958 Diversey Boulevard

CHICAGO ILLINOIS

When Writing, Please Say—"Saw Your Ad. in the C C J"

THE IDEAL, PRACTICAL SOLUTION OF THE FLORIST'S DELIVERY PROBLEM LIES IN A

Bessemer Truck

A Model C Bessemer Truck Rendering Efficient Service for a Cleveland Florist

Florists' deliveries present different problems from those of the average store. The perishable nature of the goods, the necessity of delivering in perfect condition and at a specified time, the demand for many deliveries to fall within a certain few hours of the day and the need for an unfailing, unfaltering service make a condition which a light weight, easily operated and controlled, rapidly moving and dependable commercial car ***alone*** can satisfactorily supply.

The Model C Bessemer meets these conditions to a remarkable degree and is rendering most efficient service to the florist trade, earning the same enviable reputation as it has in other lines of work. This is made possible by the excellence of its materials and parts and the high quality of its workmanship. If yours is a light, or medium weight delivery problem, consult us.

Three Models—Bodies to Suit Purchaser

A—3000 lbs. Capacity, 30 H. P.—Price, $2100

B—2000 lbs. Capacity, 30 H. P.—Price, $1800

C—1500 lbs. Capacity, 25 H. P.—Price, $1250

DEALERS: **You can make a profitable connection by handling this truck. Write for our sales plan and literature**

BESSEMER MOTOR TRUCK CO.

BESSEMER

GROVE CITY
PENNSYLVANIA

BESSEMER

Packard

PACKARD HYDRAULIC HOIST AND DUMP BODY TRUCKS

BUILT ON 3, 4, 5 AND 6-TON CHASSIS

MAXIMUM ELEVATION OF BODY. 45 DEGREES	TIME REQUIRED TO ELEVATE BODY. 20 SECONDS	TIME REQUIRED TO LOWER BODY. 15 SECONDS

ADAPTABILITY

For coal merchants, excavating, sand and gravel, paving and crushed stone contractors, brick manufacturers, quarries, wooden block manufacturers, power plants, metal mining industries, and for carrying all loose material not damaged by dumping.

FLEXIBILITY

Extremely low hoist permits use under low bunkers and chutes. Can load in low quarters where high screw hoist, chain and sprocket and other hydraulic dump bodies cannot enter.

CONTROL

Simple controlling lever on the back of the driver's seat permits him to raise, lower or hold body at any desired angle while truck is standing or running.

OPERATION

A special gear pump mounted under driver's seat and driven from the universal joint shaft through two sprockets and chain forces oil under pressure to a vertical cylinder containing a piston. The pressure elevates or lowers a piston rod travelling through the top of the cylinder. The cylinder supports two sheaves over which steel cables operate, fastened at the front end to the base of the hoisting cylinder and at the rear end to the body.

ADVANTAGES

Operates on simplest hydraulic principle. Fool proof. No exposed vertical screw to catch dirt, which grinds worm wheel to destruction. No long vertical chain and sprockets with consequent inertia and slow tilting movement. No exposed gears to become fouled with dirt and oil. No oil reservoir required.

The bridge builder's factor of safety is built into Packard cars and trucks

ASK THE MAN WHO OWNS ONE

PACKARD MOTOR CAR COMPANY

LINCOLN HIGHWAY CONTRIBUTOR

CROCE
Motor Trucks

Here are a few pertinent reasons why the representative CROCE installations shown in this advertisement are affording their owners unqualified satisfaction by giving them economical, efficient, reliable service.

Original design embodying distinctive features.
Bosch High-Tension Magneto.
Wisconsin Motors of extraordinary strength.
Timken Axles on Timken Roller Bearings.
Schebler Carburetor.
Brown-Lipe Transmission on Timken Bearings.
Spicer Universal Joints.
Schwarz Wheels with Interlocking Spokes.
Croce Patent Radiator (Kells make).
Positive Fuel-Proof Oiling System.
Special Clutch Yoke and Transmission Brake.
Greater Strength with Less Weight, and other features of equally great importance.

The CROCE is a great truck to own and a mighty satisfactory one to sell. It invariably makes good, creates friends, brings repeat orders and produces new business.

If the truck you handle doesn't do this or offer these advantageous features, it's time you inquired about the CROCE. ¾, 1, 2 and 3 ton trucks.

Croce Automobile Co.
Asbury Park, N. J.

A Two-Ton Truck That's a Winner

The DeKalb "D2"

Is a Profit Producer for the Live Dealer

With the DE KALB the energetic dealer can quickly build a mighty profitable business. The nature of the design, character of construction and high quality of all parts and material, when mentioned, always carry conviction.

It's steady, consistent, dependable service that the DE KALB renders. It grows daily in the esteem of those who use it. Its only comebacks are repeat orders. Every truck you get on your streets is a convincing demonstration of DE KALB efficiency. In economy of operation, being on the job continually, the DE KALB will be an eye-opener to the truck buyers of your locality.

THE DE KALB DOES THE MOST OF THE BEST WORK THE EASIEST FOR THE LONGEST PERIOD AT THE LEAST EXPENSE

Every Buyer of a "DeKalb" Buys Real Service

Brief Specifications:

Motor—Continental Model "C", 4-cylinder vertical L-head type; 4⅛" x 5¼".

Magneto—Bosch high-tension with fixed spark.

Carburetor—Stromberg, latest design; uniform mixture at all speeds.

Steering Gear—Non-reversible worm-gear type.

Transmission—Selective sliding gear. Three speeds forward and one reverse. Direct drive on third.

Clutch—Special cone type, leather-faced.

Drive—Left hand, center control.

Suspension—Three-point for transmission and differential housing; also for motor sub-frame. Spring-suspension radiator.

Frame—Pressed steel 6" deep; flange 2½" wide x 3/16" thick.

Front Axle—Timken, solid drop-forged carbon steel I-beam section, 2⅜" spindle. Timken roller bearings.

Rear Axle—Timken rectangular 1¾" x 3"; 2¾" spindle. Timken roller bearings.

Brakes—Two sets, both operating on rear wheels.

Tires—Dual rear; demountable rims.

Capacity—Two tons.

Body—Optional to meet requirements of any business.

Equipment—Seat with cushion, side and rear oil lamps, horn, complete set of tools in tool box.

Write today for territory, terms and complete specifications

DeKALB WAGON CO. : DeKalb, Illinois

CHICAGO SALES OFFICE, 1532 MICHIGAN AVENUE